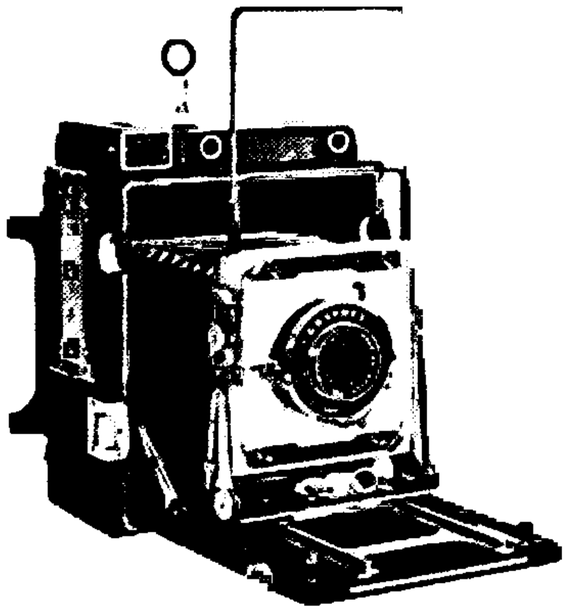
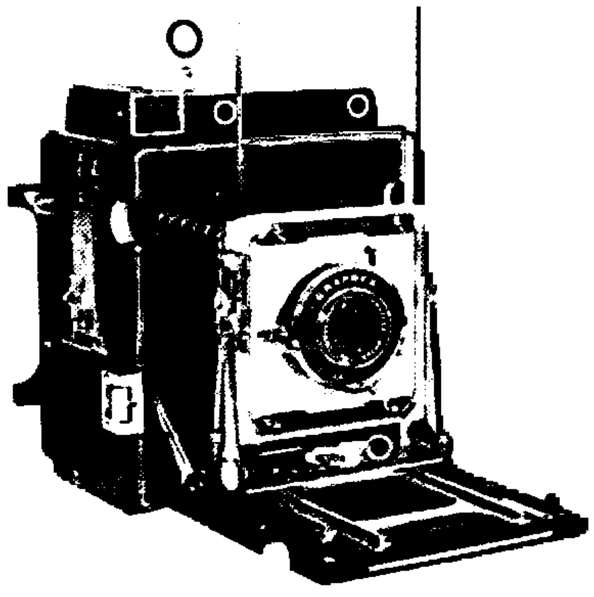
JUNE, 1965

price $5.00





graflex

SERVICE INSTRUCTIONS AND PARTS LIST

SECTION 7

"45"

PACEMAKER CROWN & SPEED GRAPHIC®

WITH GRAPHIC RANGEFINDER

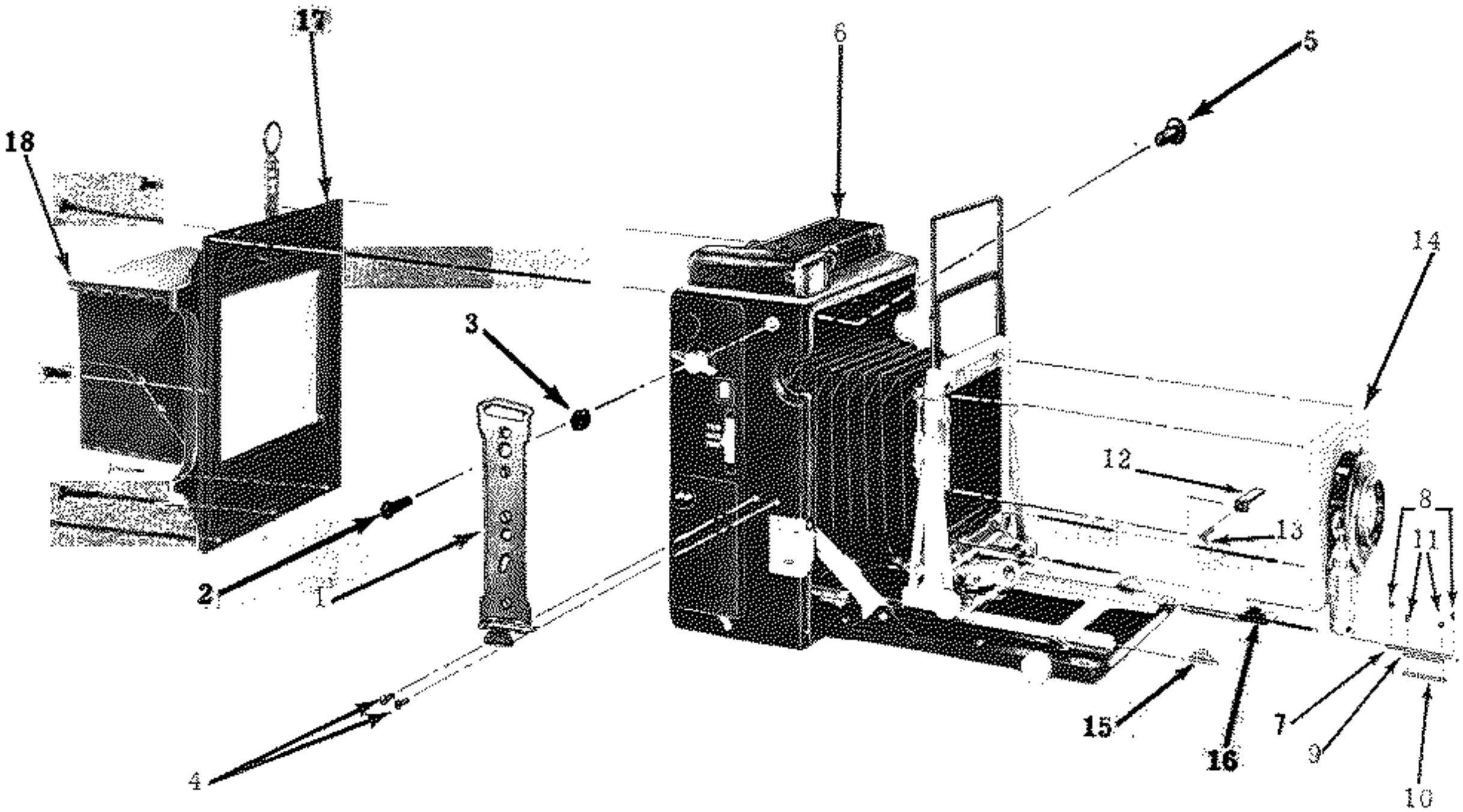
GRAFLEX, INC., A SUBSIDIARY OF GENERAL PRECISION EQUIPMENT CORPORATION • ROCHESTER, NEW YORK 14603

TABLE OF CONTENTS

Section		Title	Page
I.		Graphic Rangefinder - Viewfinder and Rangelite	4
	A.	Graphic Rangefinder	4
	B.	Operation	4
	C.	Adjustment	5
	D.	Materials	8
II.		Graflok Camera Back	9
	A.	Graflok Camera Back - Disassembly	9
	B.	Graflok Camera Back - Cleaning and Inspection	10
	C.	Graflok Camera Back - Reassembly	10
III.		Focal Plane Shutter	10
	A..	Focal Plane Shutter - Disassembly	10
	B.	Shutter Plate Removal and Disassembly	10
	C.	Shutter Mechanism Plate - Removal and Disassembly	11
	D.	Curtain and Rollers - Removal and Disassembly	12
	E.	Focal Plane Shutter - Cleaning and Inspection	12
	F.	Focal Plane Shutter - Reassembly	12
IV.		Front Standard	14
	A.	Front Standard - Disassembly	15
	B.	Front Standard Bellows Inspection and Cleaning	15
	C.	Front Standard and Bellows Repair	15
	D.	Front Standard - Reassembly	15
V.		Bed Complete	17
	A.	Bed Disassembly	17
	B.	Bed Cleaning and Inspection	17
	C.	Bed Reassembly	17
VI.		Body Complete	19
	A.	Body Release Plate - Disassembly	19
	B.	Body Release Plate - Cleaning and Inspection	19
	C.	Body Release Plate - Replacement	19
	D.	Tripod Socket Replacement	19
		Lubrication, Cleaning Solvents and Adhesives	21

PARTS LIST - 4x5 PACEMAKER GRAPHIC

Figure	Title	Page
1	Camera Complete	22
2	Graphic Rangefinder - Viewfinder	24
2A.	Rangefinder Housing	26
2B.	Base Complete - Mirror	28
3	Camera Basic	29
4	Shutter Cover Plate	32
5	Shutter Plate	32
6	Front Standard	34
7	Bed Complete	36
8	Body Complete	38
9	Graflok Back Complete	40



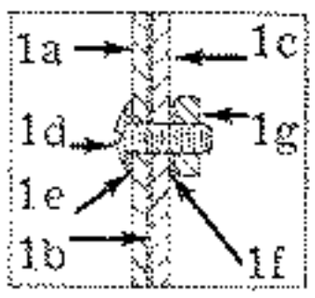


Figure 1. Camera Complete

1. Bracket-Battery Case Mounting
1a. Bracket-Outer
1b. Insulator
1c. Bracket-Inner
1d. Screw-Machine (See Parts List)
1e. Washer-Flat (See Parts List)
1f. Washer-Lock (See Parts List)
1g. Nut-Machine (See Parts List)
2. Screw-Machine (See Parts List)
3. Spacer-Special
4. Screw-Special
5. Nut-Special
6. Graphic Rangefinder-Viewfinder (Ref. Only)
7. Scale-Focusing
8. Screw-Focusing Scale (Special)
9. Scale-Index
10. Plate-Index Scale
11. Screw-Index Scale (Special)
12. Clamp-Manual Trip
13. Screw-Machine
14. Lensboard and Shutter
15. Stop Assembly-Right, Infinity
16. Stop Assembly-Left, Infinity
16a. Screw-Infinity Stop, Pointed (Rear)
16b. Screw-Infinity Stop, Flat
17. Back Complete-Graflok
18. Camera (Reference)

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER (1955-)

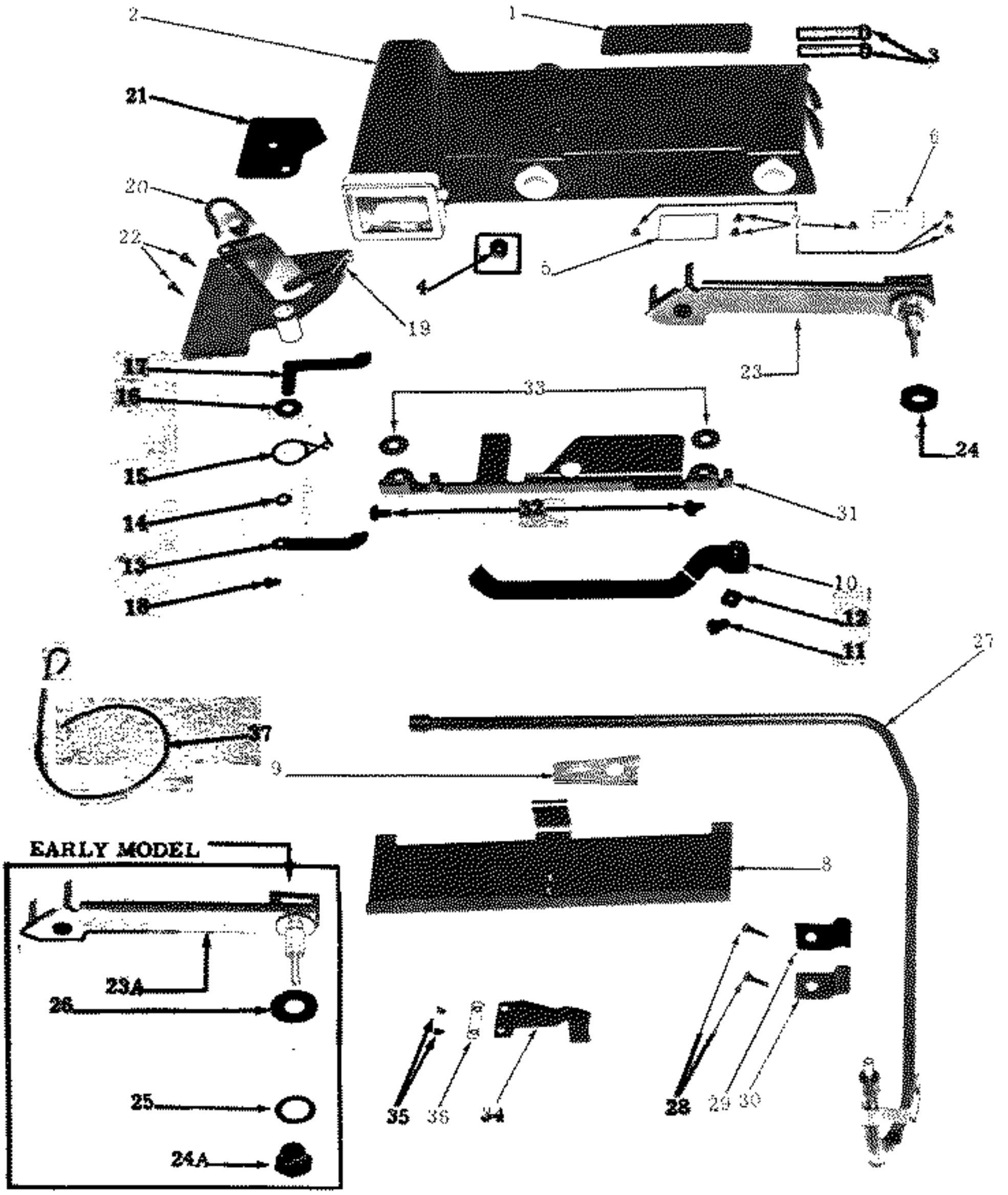


Figure 2. Graphic Rangefinder

1. Cover Assembly-Battery Compartment
2. Housing Complete
3. Screw-Machine (See Parts List)
4. Spacer-Tubular (Early Model)
5. Mirror-Transparent
6. Mirror-Opaque
7. Retainer-Mirror
8. Cover Assembly-Cam
9. Cam
10. Arm-Rangefinder
11. Screw-Set (See Parts List)
12. Nut-Mirror (See Parts List)
13. Lever-Inner
14. Washer-Lock
15. Spring-Parallax Lever
16. Washer-Flat (See Parts List)
17. Lever Assembly-Top
18. Screw-Machine
19. Spring-Parallax Slide
20. Parallax Base Complete
21. Cover-Bottom, Viewfinder (Crown only)
22. Screw-Wood (See Parts List)
23. Base Complete-Mirror (Current model)
23A. Base Complete-Mirror (Early model)
24. Nut-Special (Current model)
24A. Nut-Special (Early Model)
25. Washer-Flat (See Parts List)
26. Washer-Flat (See Parts List)
27. Tube assembly
28. Screw-Wood (See Parts List)
29. C lamp-Upper
30. Clamp-Lower
31. Bracket-Tube
32. Screw-Machine (See Parts List)
33. Washer-Flat (See Parts List)
34. Bracket-Rangefinder Actuating
35. Screw-Special
36. Plate-Clamp, Actuating Bracket
37. Spring (See Parts List)

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER (1955-)

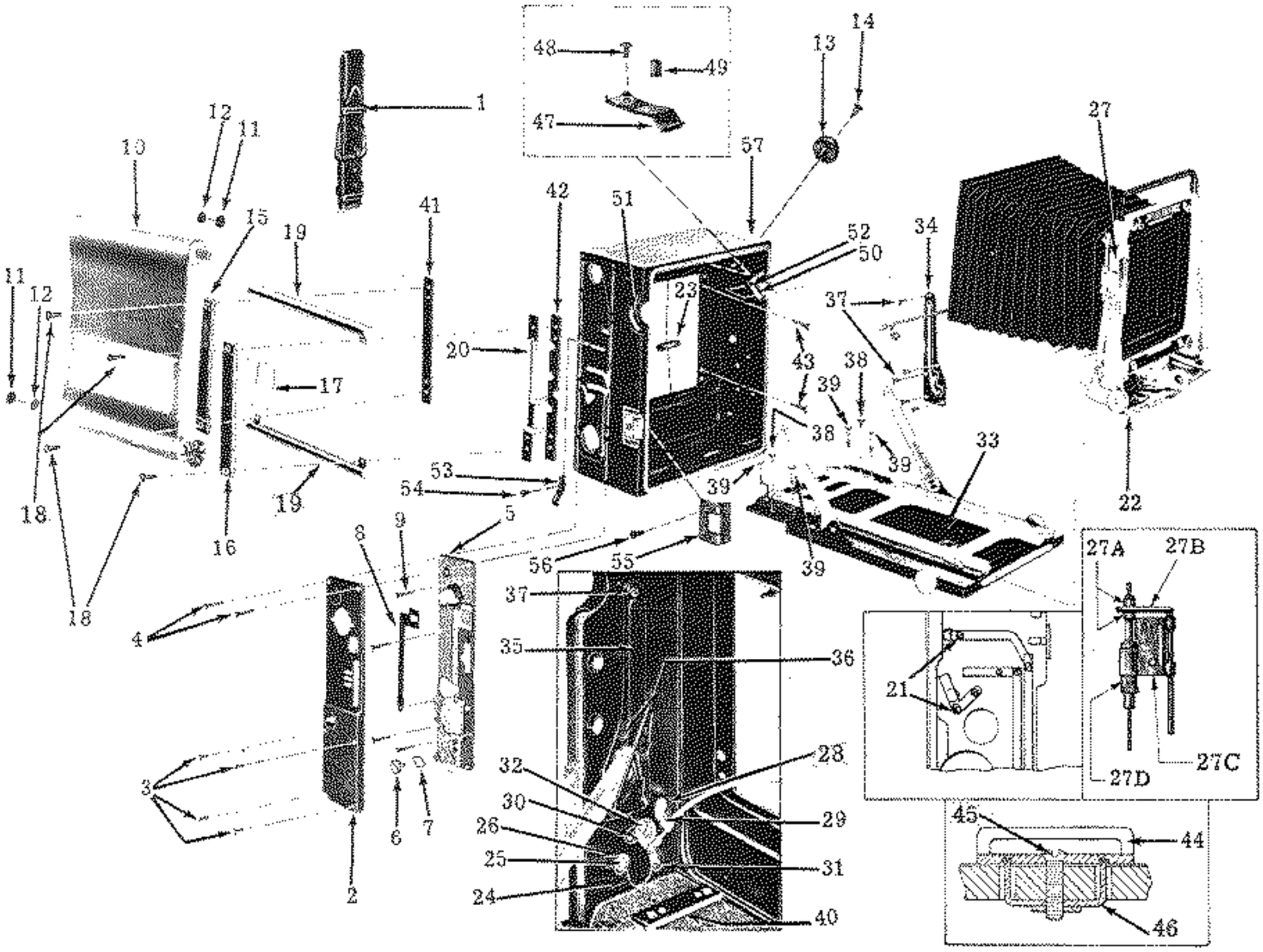


Figure 3. Camera Basic

1. Handle Assembly
2. Cover Assembly-Shutter Plate
3. Screw-Machine (See Parts List)
4. Screw-Wood (See Parts List)
5. Shutter Plate Complete
6. Screw-Retainer
7. Retainer-Tension Shaft
8. Slide-Dial
9. Screw-Wood (See Parts List)
10. Curtain and Rollers Complete
11. Washer-Flat (See Parts List
12. Washer-Flat (See Parts List
13. Bearing-Roller
14. Screw-Wood (See Parts List)
15. Block-Left
16. Block-Right
17. Contact
18. Screw-Machine (See Parts List)
19. Guide-Curtain
20. Jumper Assembly
21. Screw-Wood (See Parts List)
22. Standard Complete-Front
23. Clip-Bellows Retaining
24. Spring-Cable Release
25. Screw-Wood (See Parts List)
26. Washer-Flat (See Parts List)
27. Cable Release Assembly

27A. Nut-Cable Release
27B. Rod-Manual Trip
27C. Bracket-Manual Trip
27D. Body-Cable Release

28. Screw-Wood (See Parts List)
29. Screw-Wood (See Parts List)
30. Lever Assembly-Cable Release
31. Screw-Wood (See Parts List)
32. Screw-Special
33. Bed Complete
34. Plate-Bed Brace, Left
35. Plate-Bed Brace, Right
36. Screw-Wood (See Parts List)
37. Screw-Wood (See Parts List)
38. Screw-Wood (See Parts List)
39. Screw-Bed Assembly
40. Shim-Yoke Guide, Case (See Parts List)
41. Spacer-Left Block
42. Strip-Mounting Insulation
43. Screw-Machine (See Parts List)
44. Bracket-Handle
45. Screw-Machine (See Parts List)
46. Nut-Handle Bracket
47. Spring-Bed Catch
48. Screw-Machine (See Parts List)
49. Button
50. Escutcheon-Left
51. Escutcheon-Right
52. Pin-Escutcheon (See Parts List)
53. Spring-Shift Slide
54. Screw-Wood (See Parts List
55. Plate-Release Slide
56. Screw-Release Slide Plate
57. Body Complete

PACEMAKER GRAPHIC "45" SPEED & CROWN WITH GRAPHIC RANGEFINDER (1955-)

INTRODUCTION

This section of the Graflex Service Parts Manual covers the service of the Pacemaker Speed and Crown Graphic "45", with Graphic Rangefinder with Viewfinder and Rangelite. (Manufactured by Graflex since 1955). The text and illustrations are based on the "45" Pacemaker Speed. The Speed and Crown are partially identical in construction and service; however, the differences are described in the text.

I. GRAPHIC RANGEFINDER-VIEWFINDER & RANGELITE

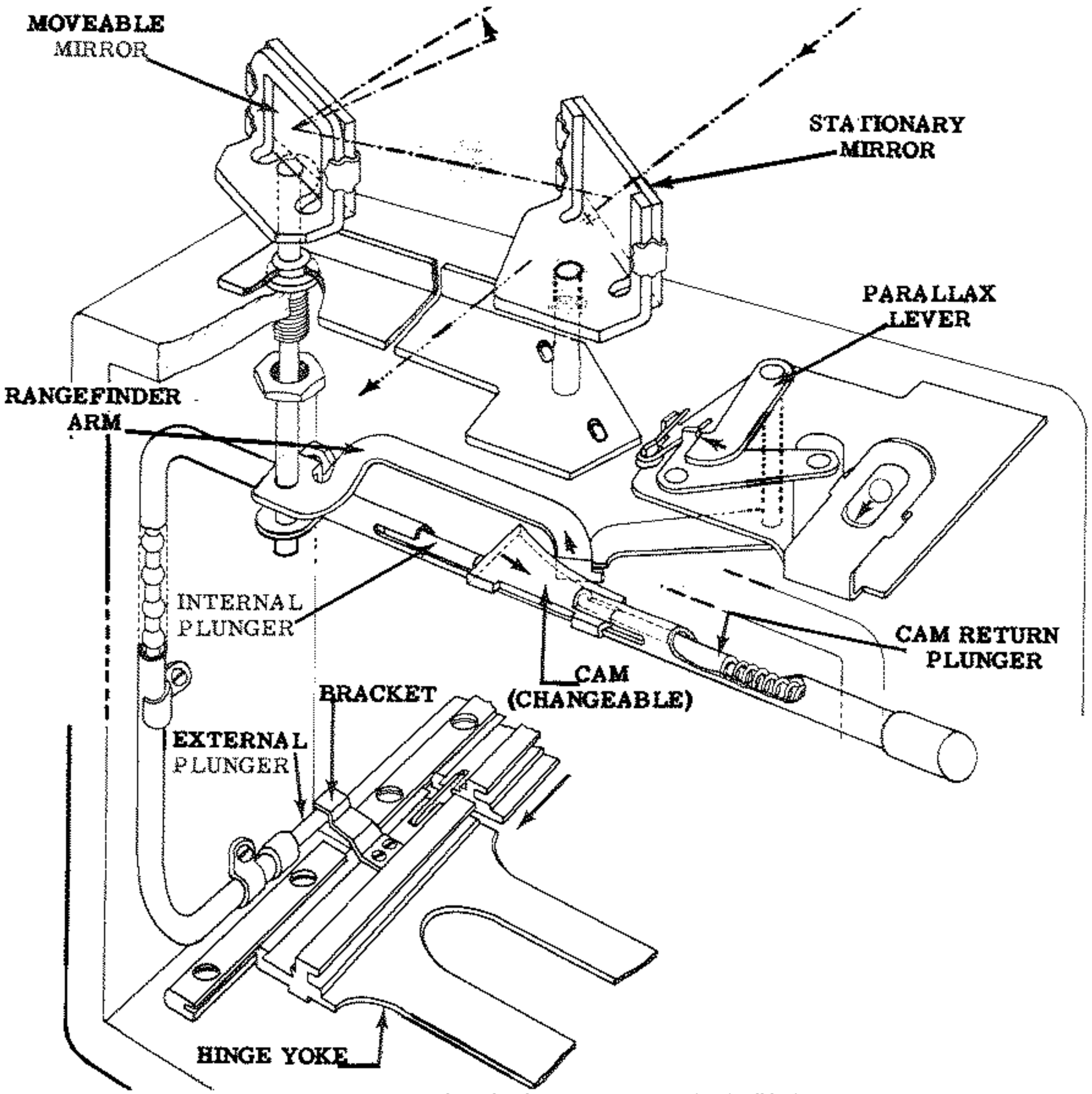


Figure 4. RANGEFINDER OPERATION

A. GRAPHIC RANGEFINDER

The Graphic Rangefinder with viewfinder and rangelite is mounted to and becomes an integral part of the top of the Pacemaker Speed or Crown Graphic "45" cameras. Once the rangefinder is assembled to the camera and adjusted it can be used with a wide variety of lenses through the use of interchangeable lens cams. Lenses may vary in focal length from wide angle through tele-photo. The viewfinder and rangelite are incorporated as part of the assembly.

B. OPERATION (Figure 4)

To adjust the rangefinder it is important to understand its operation. A bracket on the left side of the hinge yoke actuates an external plunger. This plunger, part of the tube assembly, transmits its motion through a column of balls, or balls and spacers in a formed tube to an internal plunger that pushes the cam to the right; a spring loaded plunger returns the cam and column and plungers to their original position upon removal of pressure by the actuating bracket to the left. The yoke is moved in or out for focusing. The rangefinder arm rides on the cam; motion of the arm, caused by the cam, is transmitted to the movable mirror shaft on which the arm is mounted to deflect the image. The movable image is reflected to the transparent mirror and back through the eyepiece. The

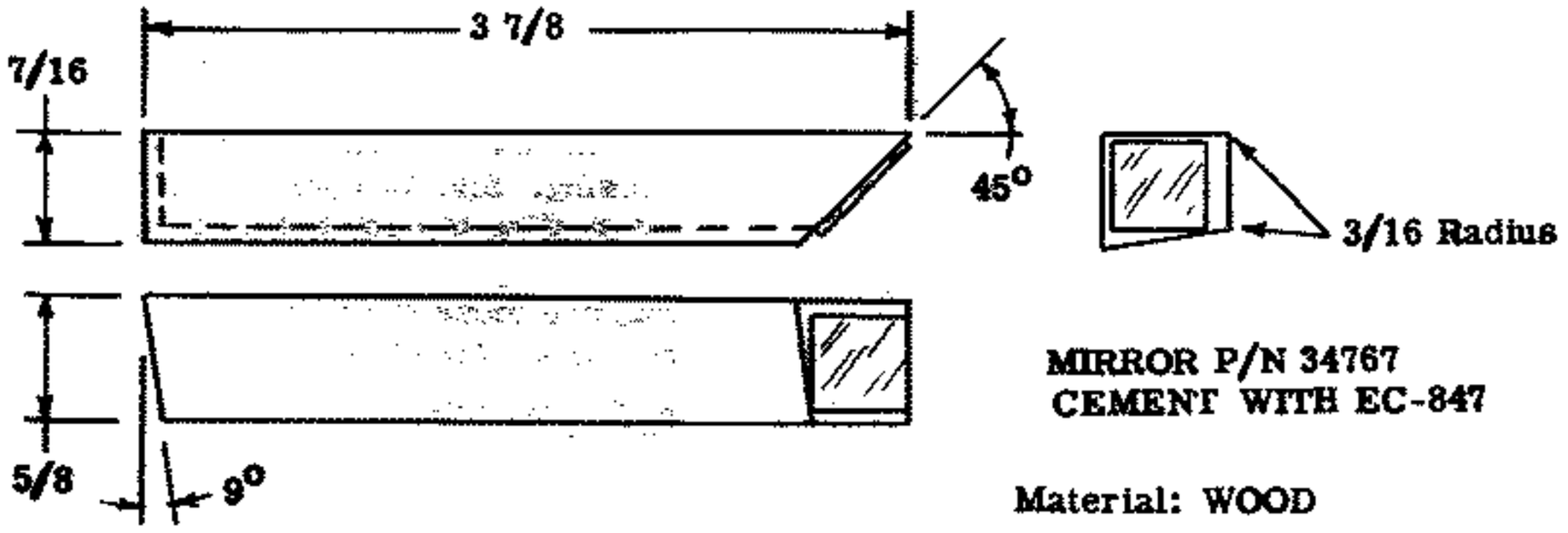


Figure 5 LAMP ALIGNING BLOCK

stationary image adjusting screw, on the stationary bracket, tilts that mirror so that the images coincide in respect to height.

The parallax actuator levers, attached to a common shaft, ride under spring pressure on the rangefinder arm. This lever slides the parallax mask up or down in the base of the parallax assembly, thus automatically correcting for parallax.

The rangelite, having its switch button on the left side, is operated by pressing the momentary contact switch. Batteries contained in the housing operate the lamp. Image of the bulb filament is projected from a fixed mirror through a projection lens and on the transparent stationary mirror. At this point, part of the light is transmitted and part is reflected to the movable mirror and both light beams fall on the subject. When the filament image, reflected by the two rangefinder mirrors, coincides the camera lens is in focus at that point.

C. ADJUSTMENT

1. Special Tools:

a. Master Cam (1 inch long X .032 inch thick X 0.437 ± .0001 inch wide), used to set infinity.

b. Lamp aligning block (figure 5), used to simplify focusing of Rangelite.

2. Adjustment: Adjustment differs from past practices .... the rangefinder is adjusted to infinity; then, the lens, focusing scales and infinity stops are positioned as follows:

a. Remove the rangefinder housing by unscrewing two slotted screws on the top and lift housing straight up. Pull front standard forward and unsnap the inner cover by lifting one and then the other of the end hooks from the slot in the bracket-tube.

b. Assemble the master cam gage in the cam slot (figure 6). The bed yoke must be back as far as possible. Assemble the yoke bracket and slide to a position that presses on the lower tube plunger to cause the master cam to line up with the edge of the rangefinder arm (figure 7).

NOTE: 1. The above proceedure must be followed due to the fact that the .437 (infinity point) varies in respect to the "line-up edge" on

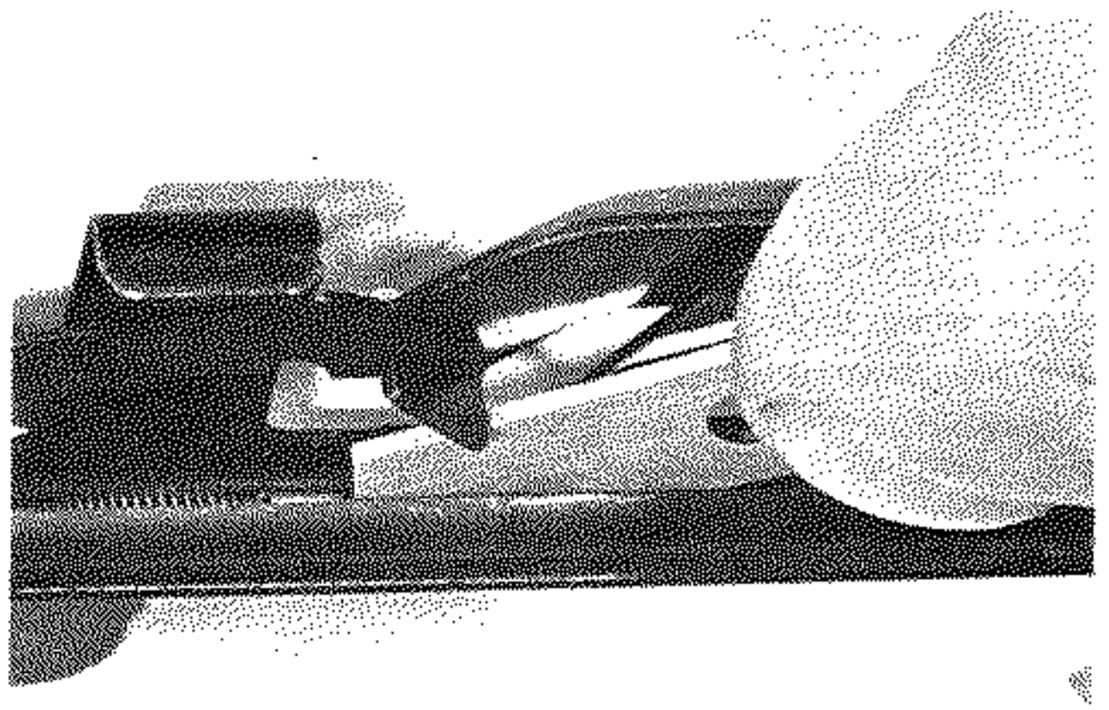


Figure 6. CAM INSERTING

production lens cams. Thus, lens cams are not interchangeable between similar lenses or cameras without consideration of rangefinder adjustment; however multiple fitting can be made on one camera and the lenses and their matching cam can be interchanged with other cameras if the initial infinity is considered.

2. For multiple fitting that includes 10 to 15 inch focal lengths, see paragraph C.3.

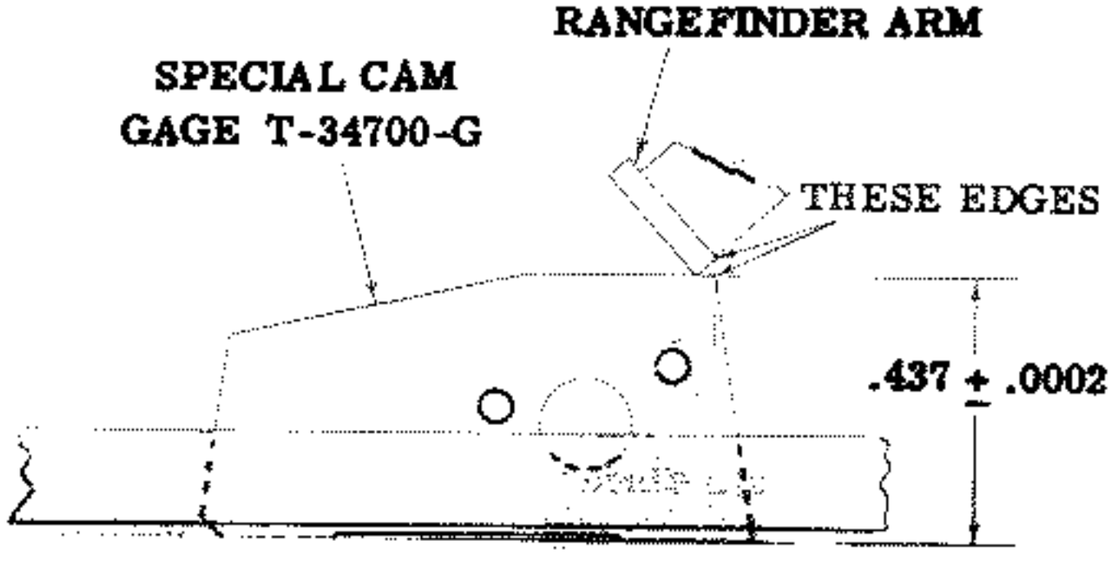


Figure 7. MASTER CAM - PRE-INFINITY SETTING

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER (1955-)

c. To set rangefinder infinity, sight the rangefinder on a target of 500 feet or more. Move the yoke forward about 1/8 inch and lock the yoke with lever on front right corner. Adjust the moveable mirror shaft by loosening the 3/16 inch hexagonal rangefinder arm screw. Turn the mirror mount while observing the movable image in the fixed mirror. When the images are aligned, tighten the hex head screw. Adjust double vision by turning the set screw on the fixed mirror mount (figure 8). Observe infinity and readjust if necessary. Remove master cam.

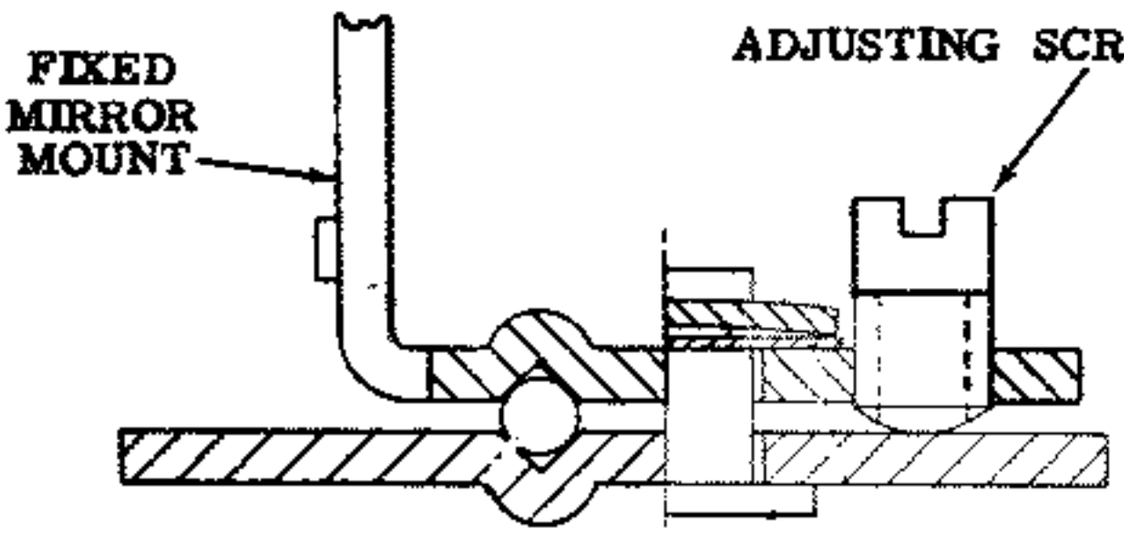


Figure 8. DOUBLE IMAGE ADJUSTMENT

d. The lens cam must be selected to suit the lens being fitted. If a focusing scale has been fitted to the lens, refer to the number stamped on the back of the scale when ordering cam. If cam and scale are required, measure the lens movement to the nearest thousandths of an inch from infinity (500 feet or more is sufficient) to the following near distance:

Lens Focal Length	Near Distance (Target to film plane)
3 to 7 inch	4 feet
7 to 15 inch	10 feet

To be assured of accurate measurement of a lens, it may be shipped to the nearest Graflex Service Department for collimation and selection of cam and scales.

e. Assemble the required lens cam (figure 6) and focus rangefinder at infinity and lock bed. Assemble rangefinder housing and secure with its mounting screws under normal tension. Check the image at infinity to be sure that it has not shifted due to assembly of the housing. Unlock the bed yoke and move forward to set the scales at the nearest marked distance. Check the rangefinder image at this distance measured from the film plane to the target.

f. Focus rangefinder on infinity and lock yoke. Assemble lensboard and move front standard so that lens focuses sharp infinity target on the ground glass. Use a square to check squareness of front standard on yoke. Lock standard when square and infinity is sharp. Move infinity stops against front standard and tighten flat point headless set screw on front of stop. Check ground glass, rangefinder and focusing scales at the nearest scale distance measured from the target to the film plane. Center punch yoke through the rear stop screw hole and assemble cone point headless set screw.

g. Assemble rangefinder housing and secure with two oval fillister head screws, #6-32 x 7/8 inch long.

h. Batteries are positioned in the rear rangefinder housing. Slip two penlite batteries into the openings, alternating top and bottom position. Replace the cover by slipping one end into the opening; press in the other end and move flush (figure 6). Lamp should light when red button on left is pressed.

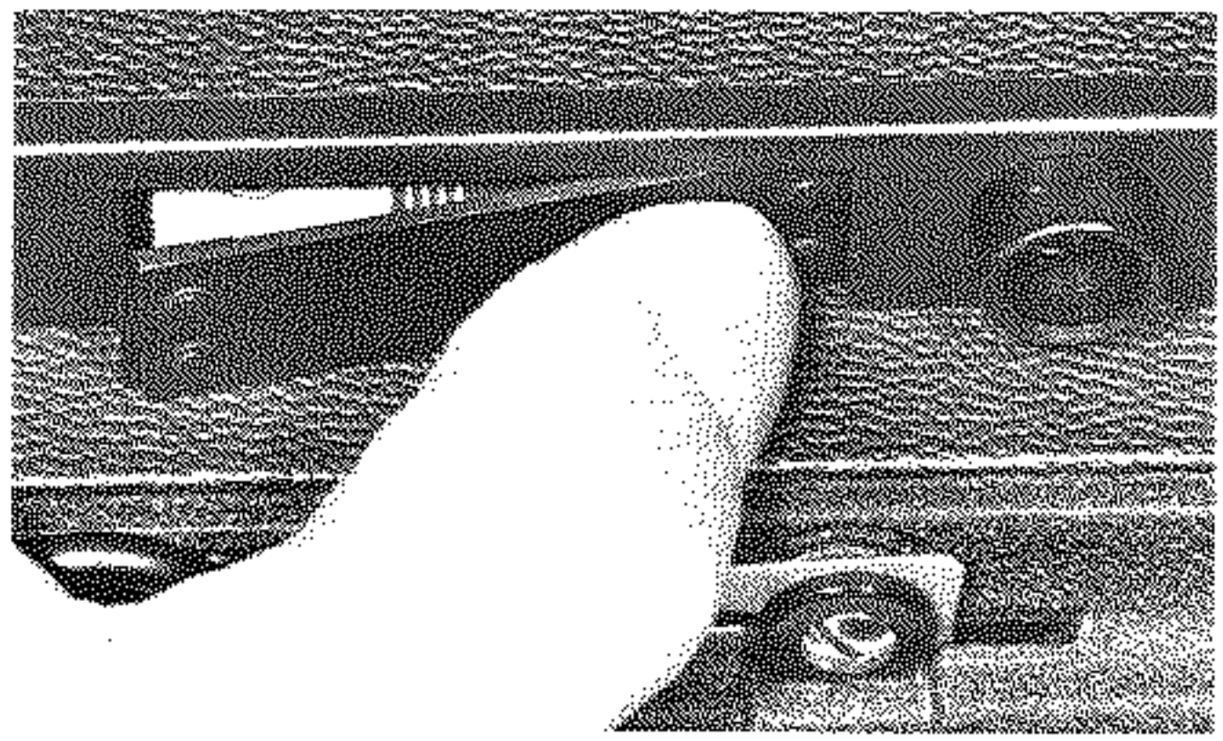


Figure 9. INSERTING BATTERY COVER

i. The cam retainer spring, selected to suit the diameter of the lens, is snapped around the lens flange so that the cam can be stored on the rear of the lensboard (figure 10).

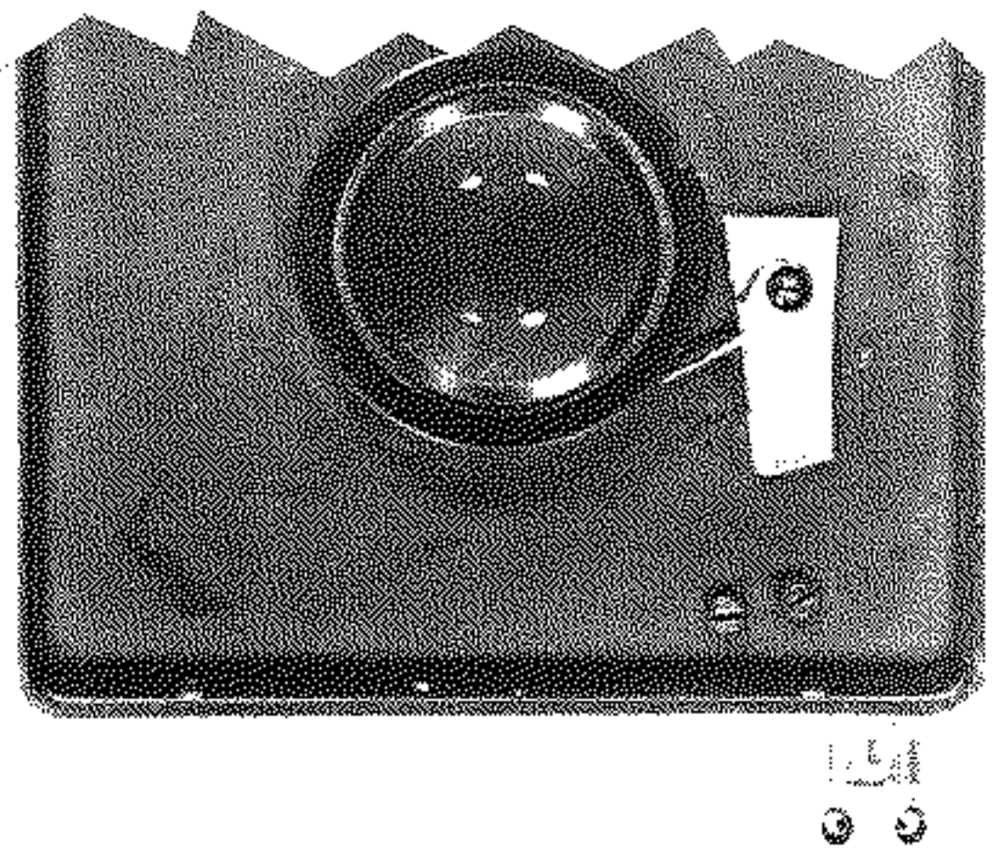


Figure 10. CAM WITH RETAINER SPRING

3. Multiple Fitting:

a. Same camera. If additional lens are fitted to one camera, perform only the adjustment specified in subparagraphs C.2e and f.

NOTE: Long focus lenses (10 to 15 inch telephoto) can be fitted. In this case, due to the very slight slope of the cam, it is advisable to use, as a master cam the cam of the longest lens. In this instance it will be necessary to adjust the rangefinder infinity as required in subparagraphs C.2.b. and C.2.c.

b. Different camera. If special lenses are to be used on a different camera, set up the infinity for the second camera as required in subparagraphs C.2b and c. Take consideration of the preceeding **NOTE** on long focus lenses.

NOTE: Remember to order and attach duplicate focusing scales to the second camera.

4. Special Adjustments:

a. Malfunctions

MALFUNCTION	CAUSE	REMEDY
1. Infinity not constant.	Loose base plate.	(Early Model) Cut out covering and install seating washer (par. C. 4.b). Tighten rangefinder base lock nut.
	Loose rangefinder arm.	Tighten hex head screw and seal threads with Glytol cement.
	Loose rangefinder bracket.	Replace screws (par. C. 4.c).
2. Double image.	Adjustment not stable.	Readjust, see figure 8.
3. Close target does not range.	Short tube plunger.	(Early Model) Use longer plunger (par. C. 4.d)
4. No parallax adjustment.	Spring broken or unhooked.	Remove housing and service spring, see figure 11.
5. No Rangelite.	Weak batteries.	Replace with new batteries.
	Lamp burned out.	Replace and focus (par. C. 2.f).
	Contacts deformed.	Replace or reform.

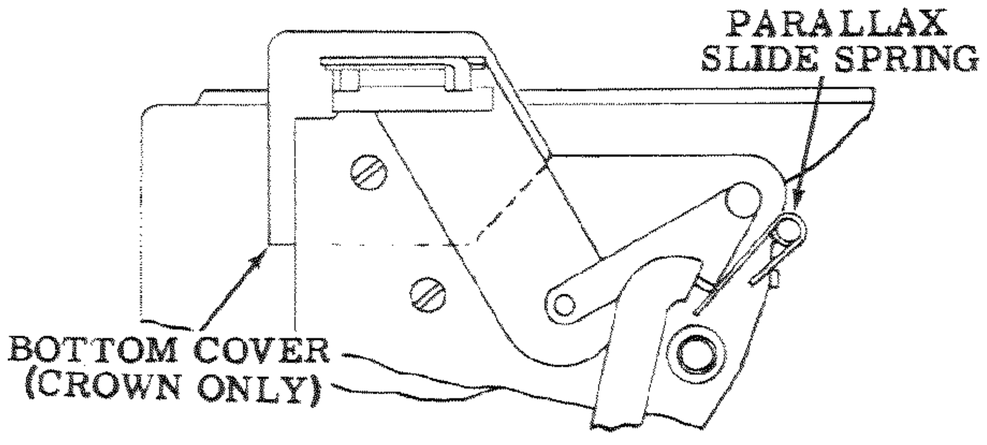


Figure 11. VIEWFINDER PARALLAX SLIDE SPRING

NOTE: The following applies to early models having base plate 34702G2.

b. Rangefinder base seat washer is positioned on top of the case below the movable mirror to provide a firm mounting surface for the base.

1) Remove the rangefinder arm by loosening its hex head screw.

2) Remove the special hex head base lock nut.

NOTE: This nut is more accessible if the tube is removed. To remove tube, spread tabs on top tube bracket and remove tube clamps on side of camera.

3) Lift rangefinder base from top of camera.

4) Cut covering from around base mounting hole so that 19/32 diameter washer (P/N 30473-P68) will lay on the mahogany body.

5) Apply Wood-Lok on both sides of washers, position and reassemble. Tighten nut to a torque of 8 to 12 inch pounds when the base is parallel to the front of camera body within 0.010 inch.

6) Reassemble all other parts; apply Wood-Lok to wood screws on side tube clamps, see following paragraph c.

c. Rangefinder actuating bracket must be mounted tight on the rear yoke section. Early models will require replacement of clamp screws with a special flat head screw (P/N 34932), figure 12.

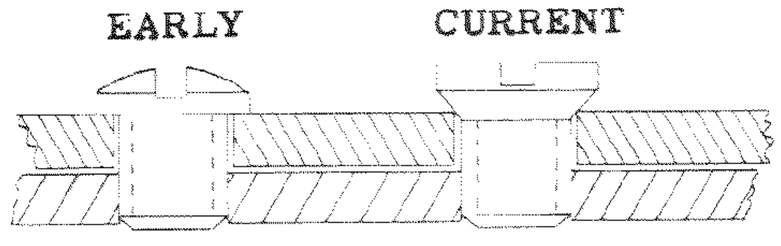


Figure 12. BRACKET SCREWS

d. Lower tube plunger was made longer. An early model plunger will extend about 13/16 inch from the tube cap while a later model will extend about 7/8 inch. An old plunger can be replaced as follows (figure 13).

1) Remove the bed bracket.

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER (1955-)

2) Lay the camera on its back, remove the lens cam and use a long nose pliers to loosen the plunger tube cap.

3) Remove the cap and plunger.

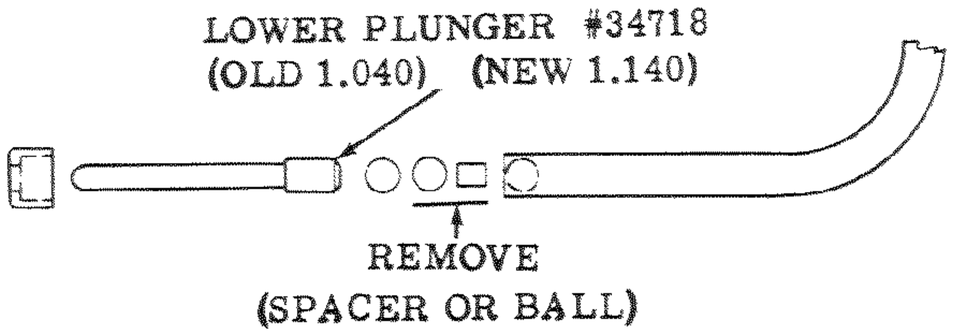


Figure 13. PLUNGER REPLACEMENT

4) Due to the longer plunger, it will be necessary to remove one spacer tube or ball. If the tube contains both spacer tubes and balls, remove the spacer tube. Insert a scribe in the lens cam slot and press on the plunger to bring the ball to the end of the tube so that it can be picked off with tweezers.

WARNING: Do not tip the camera so that balls and or spacers will fall out of tube. There are approximately 71 or 72 balls, or 44 balls, and 42 spacers alternating with a ball at lower end. The tube must be removed to measure the correct loaded dimension (figure 14). Vary components by adding one ball or removing one spacer or by selective use of left plunger or any combination of these three variations.

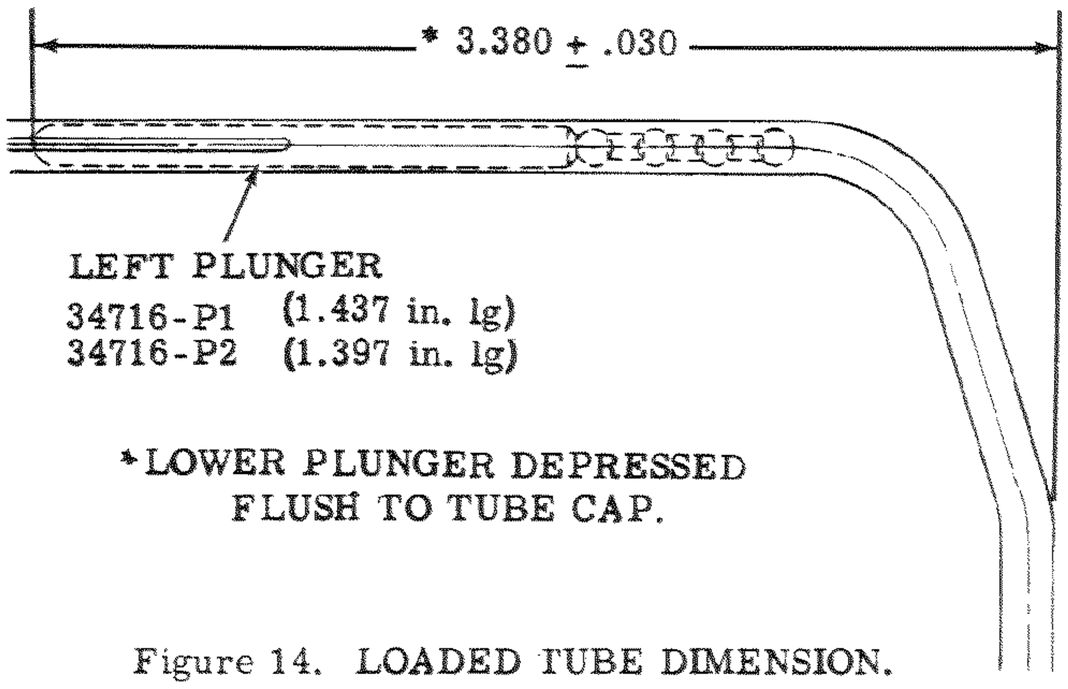


Figure 14. LOADED TUBE DIMENSION.

e. Tube Clamp. A second tube clamp has been added to hold the horizontal position of the tube more rigid. Figure 12 illustrates the location of the tube and its clamps.

e.1. Rangefinder Base and Lock Nut. To reduce image-jump to a minimum, the rangefinder base, shaft spring and lock nut have been redesigned. This change incorporates a groove in the mirror shaft held in position by a ball under spring tension. (Parts List, figure 2B.) To mount new base apply Glyptol Cement under face of bearing on base plate assembly and also on lock nut. Tighten lock nut until it is forced into wood

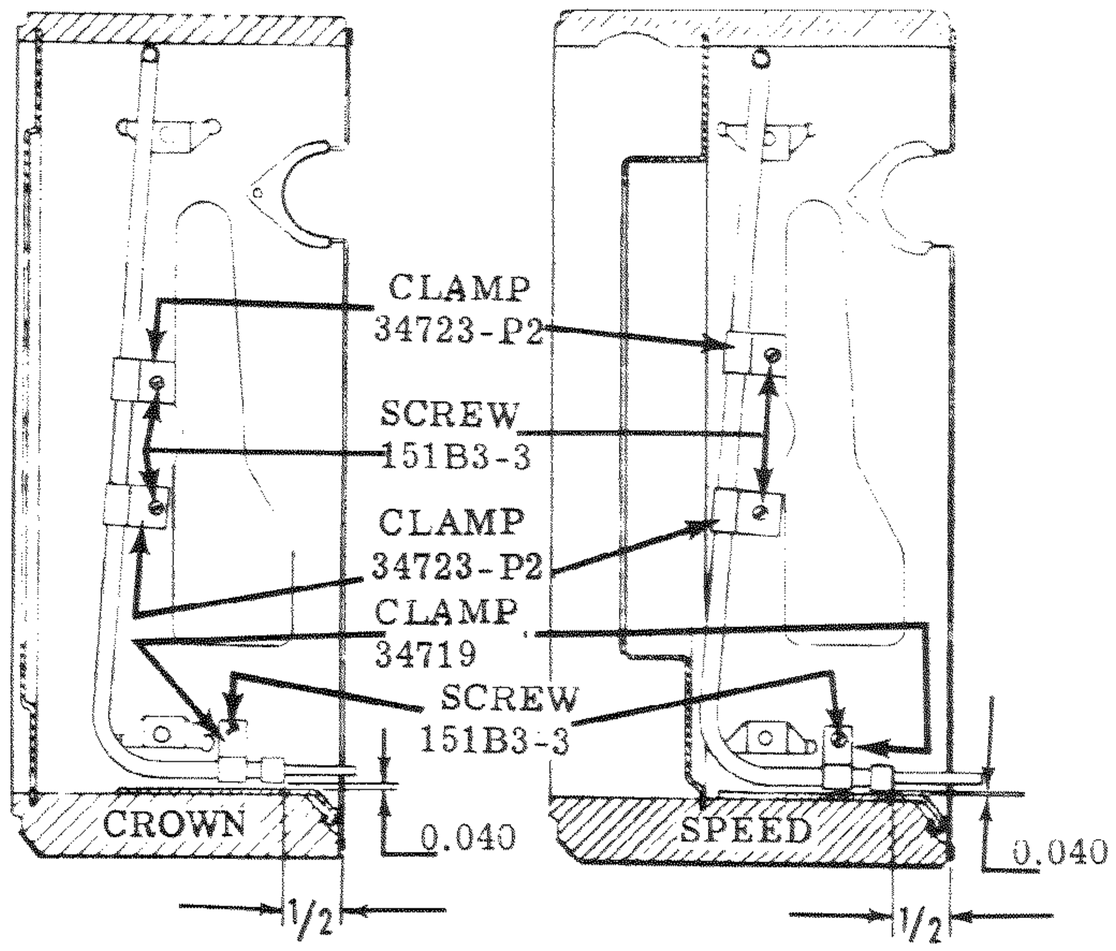


Figure 15. TUBE CLAMPS

body approximately 0.010 inches.

f. PRECAUTIONS: The major difficulty will be image jump caused by one of the following:

1) Rangefinder arm rubs on center bed latch or on tube bracket. Loosen screw and lower arm on shaft.

2) Cam might have been misused. Check cam surface for nicks or burrs and polish with very fine stone.

3) Very rare, but the spring inside mirror shaft bushing may be too loose and allow image to flicker. (Early Model).

CAUTION: If spring is too tight, image will have additional back lash.

4) Base Complete loose. Check nut that secures the Base Plate to Camera and tighten.

5) Bent Mirror Mount Assembly. Replace.

6) Tension on Parallax Lever Spring too great, causing Rangefinder Arm to slide with cam instead of pivoting. Release tension on spring.

D. MATERIALS

1. Wood-Lok Cement. Apply to
   a) Rangefinder base seat washer (early model).
   b) Tube clamp wood screws.
   c) Parallax base screws.
2. Glyptol Cement. Apply to
   a) Rangefinder Arm screw.
   b) Parallax lever screw.
   c) Actuator bracket screws.
   d) Base Assembly bearing.
   e) Rotating Mirror lock nut.
3. Molycote (Powered Type Z). Apply to
   a) Tube spacers.
   b) Parallax slide.
   c) Rotating Mirror Mount Shaft.

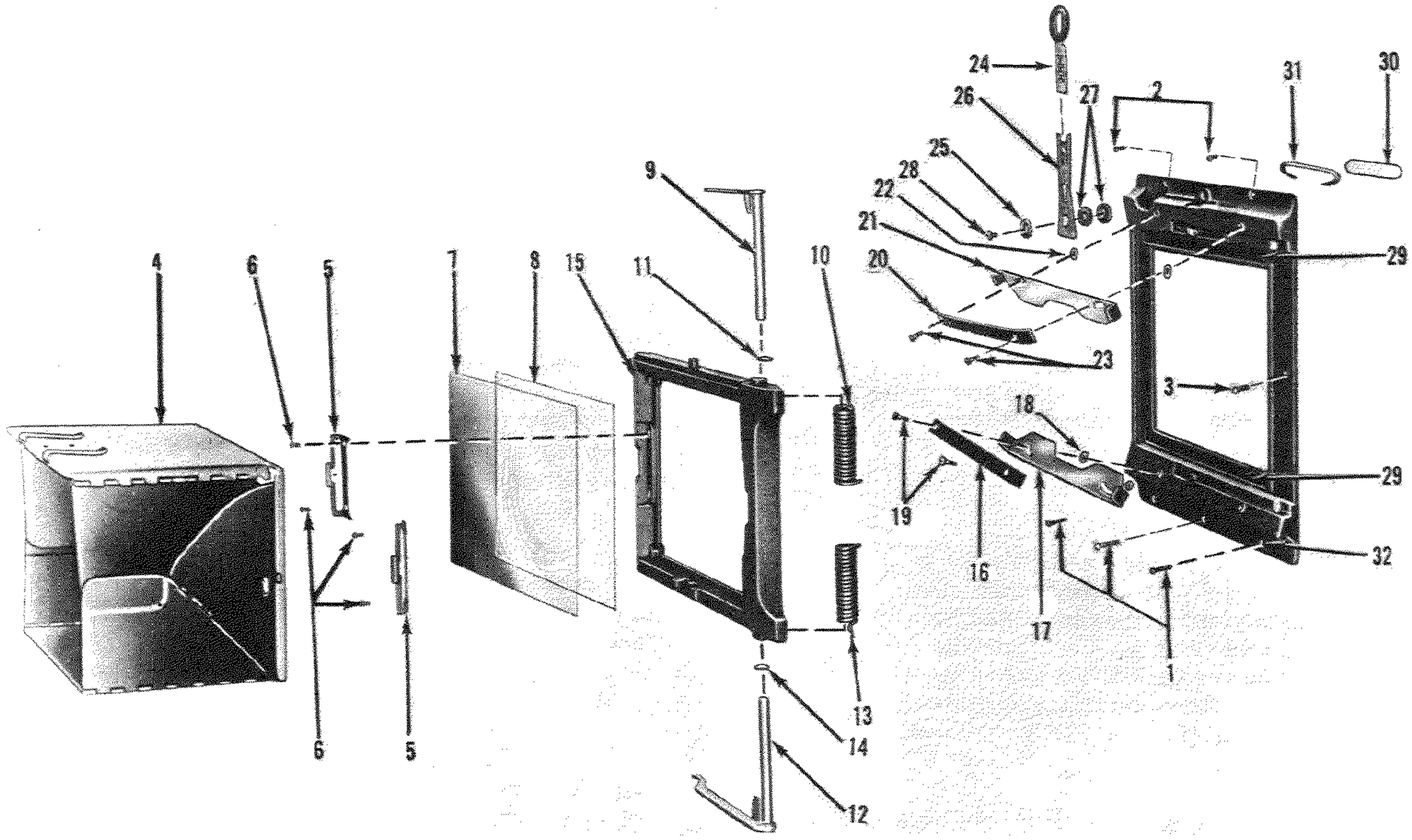


Figure 16. Graflok Back and Hood Assembly

1. Hood Assembly
2. Screw-Self Tapping (See Parts List)
3. Screw-Self Tapping (See Parts List)
4. Screw-Wood
5. Retainer
6. Screen-Ground Glass Focusing
7. Screen-Ektalite
8. Screw-Machine (See Parts List)
9. Arm Assembly-Upper
10. Spring-Upper
11. Washer-Flat (See Parts List)
12. Arm Assembly-Lower
13. Spring-Lower
14. Washer-Flat (See Parts List)
15. Frame-Focusing
16. Spring
17. Slide Lock-Lower
18. Washer-Flat (See Parts List)
19. Screw-Slide Lock
20. Spring
21. Slide Lock-Upper
22. Washer-Flat (See Parts List)
23. Screw-Slide Lock
24. Peepsight Assembly
25. Cap
26. Carrier-Peepsight
27. Washer-Flat (Special
28. Screw-Machine (See Parts List)
29. Strip-Light Seal
30. Plate
31. Spring
32. Back

II. GRAFLOK CAMERA BACK

A. GRAFLOK CAMERA BACK - DISASSEMBLY (Figure 16)

1. Remove the focusing panel frame complete by simultaneously pressing the knurled finger pads of the upper and lower arm assembly (9 and 12) and sliding the frame (15) to the right, free of the arm hooks.

2. Remove the long self-tapping screws (2) at the bottom and short self-tapping screws at the top (3) and one wood screw (4) at the right side.

3. Remove the hood assembly (1) by pressing outward on the tab of the hood retainer (5).

4. Remove the focusing screen (6), Ektalite screen (7) and the two retainers (5) secured by four machine screws (8).

NOTE: A peepsight erecting spring (31) is located in the cavity on the inside of the back and is concealed by a peepsight spring plate (30).

5. To remove the peepsight erecting spring (31) use a sharp pointed instrument to pry out the peepsight plate (30); however, do not disassemble unless the peepsight will not stand erect.

CAUTION: When performing the next operation, hold the panel so that the springs will not fly loose into the face.

6. Pry the arm assemblies (9 and 12) from their respective bearing holes. ease each spring terminal from its associated arm tab, and remove washer (11) or (14) from the arm shafts.

B. GRAFLOK CAMERA BACK - CLEANING AND INSPECTION.

1. Wash the ground glass focusing screen and Ektalite screen with soap and water; rinse thoroughly and dry.

CAUTION: Do not use cleaner containing an abrasive or solvent on either ground glass or Ektalite screen that will scratch or react on plastic.

NOTE: The hood assembly (1) is assembled with staked hinge pins. It should not be disassembled, but replaced as a unit so that the trouble free operation can be maintained. Clean the upper and lower sidelocks (17 and 21) in solvent, AN-T-37a.

2. Check focusing frame (15) and back (32) on a machined surface plate. If these parts do not lie flat they must be straightened.

C. GRAFLOK CAMERA BACK - REASSEMBLY

1. Assemble the peepsight as follows:

a) If the peepsight erecting spring (31) has been removed from the inside cavity of the back (32) position the new spring in the cavity with the open end of the spring at the bottom. Position the cover plate (30) in the cavity bow side out, flatten and stake at several points along the edge. Note: Apply AN-G6 to top surface of erecting spring before assembling.

b) Assemble the peepsight assembly (24) to the carrier peepsight (26). Position the two washers (27) over the mounting hole on the outer surface and lay the carrier peepsight, with peepsight assembly attached, in the slot provided. Position the cap (25) and apply a touch of shellac beneath the screw head (28) and tighten.

2. The slidelocks (17 and 21) should be lubricated by wiping both sides lightly with a block of paraffin wax. Federal Specification VV-P-121a. Assemble washers (18) or (22) and position slidelocks so that the slots angle to the left and toward the center. Position spring (16) or (20) and secure with special slidelock screw (19) or (23) so that the screw shoulder fits within the slot of the slidelocks.

3. Focusing panel, arm and spring replacement. To simplify the following step, fabricate a special spring tool from a 1/4 inch diameter rod about 6 inches long. Drill a .086, (No. 44) diameter hole in the end. If facilities do not permit fabrication of this tool use heavy pliers.

CAUTION: Hold the frame in a position so spring will not hit the repairman if it should kick out.

a) To reassemble the arms and spring, first place one washer (11) or (14) over the arm shaft. Spring (10) actuates the upper arm (9), and spring (13) actuates the lower arm (12). Drop the straight end of one spring into its correct relative position in the cavity of the focusing frame (15). Slip the tool over the formed end of the spring or use a heavy duty pliers and wind the terminal 1/2 turn clockwise and hold. Then push the arm shaft through the outer casting hole and the spring into the center casting hole. Release the spring terminal so that it bears on the arm tab.

b) Assemble Ektalite screen (7) and ground glass screen (6) so that the groove side of the Ektalite is in contact with the frosted side of the ground glass screen. Polished side of the ground glass screen will be on the outside. Assemble two retainers (5) and secure with four machine screws (8).

c) Fold the focushing hood (1) by squeezing the sides together, swinging up on the bottom and lastly, swinging the top down to latch.

d) Lay the back on the camera and be sure that the leather covering of the camera base is tucked under all overlapping edges of the back. Assemble the long self-tapping screws (2) on the bottom, two short self-tapping screws (3) on the top and one wood screw (4) on the right center edge.

e) Lay the frame assembly on the back and slide to the left to hook the upper and lower arms (9 and 12) under the back frame hooks.

III. FOCAL PLANE SHUTTER

A. FOCAL PLANE SHUTTER - DISASSEMBLY

Operate the shutter to check time and synchronization. The figures appearing in the shutter cover window are fractional parts of a second. The synchronized speeds, marked in black, are 1000, 500, 250, and T (Time) for class FP (Focal Plane) flash lamps. Unsynchronized speeds are marked in red.

B. SHUTTER PLATE REMOVAL AND DISASSEMBLY.

1. Remove the shutter plate cover assembly (2, figure 3), that is secured by four machined screws (3) and two wood screws (4).

2. Remove stud (1, figure 17), insulator (2), and washer (3), if necessary.

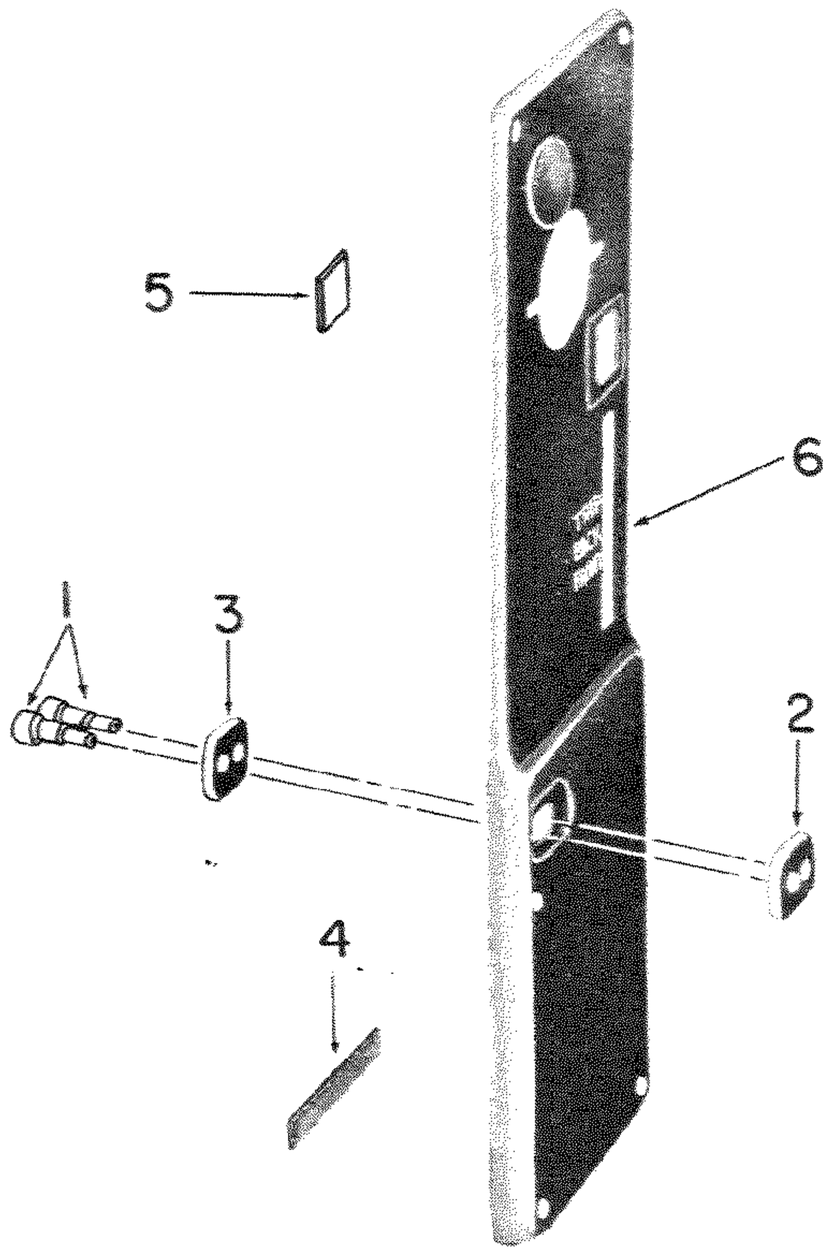


Figure 17. Cover Shutter Plate

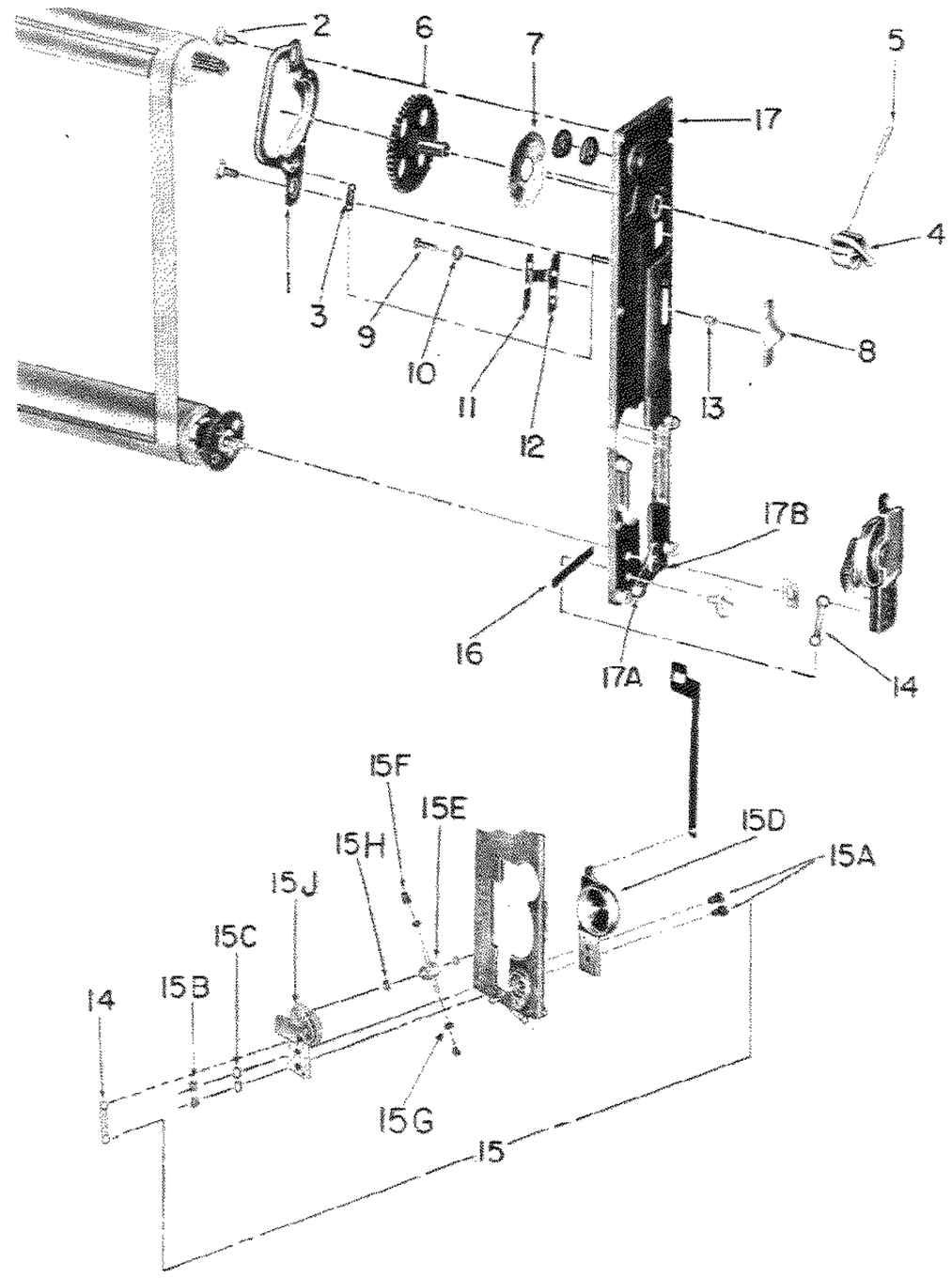


Figure 18. Shutter Plate

1. Stud-Receptacle Contact
2. Insulator-Receptacle
3. Washer-Receptacle
4. Seal-Dust
5. Window-Shutter Plate
6. Cover-Shutter Plate

C. SHUTTER MECHANISM PLATE - REMOVAL AND DISASSEMBLY.

1. Remove the slide dial (8, figure 3) from the governor stud. Remove the shaft retainer screw (6) and slowly unwind the tension shaft retainer (7). Swing the retard cam lever assembly (17A, figure 18) forward to raise the governor. Remove four wood screws (9, figure 3) and lift the shutter mechanism plate assembly (5) from the camera.

2. The shutter plate (figure 18) is disassembled in four stages; disassemble the portion necessary.

a) Escapement, Master Gear, Winding Key.

a) Escapement, Master Gear, Winding Key.

The escapement (1) is secured by two escapement screws (2). Remove and unhook the escapement spring (3). Remove the taper pin (5), the winding key assembly (4) and then the master gear assembly (6) from the inside. Lift the shutter dial (7) from its boss.

b) Shift Slide (8). To remove, unscrew the machine screw (9) and lock washer (10). Lift off the shift slide spring (11) and the shift slide plate (12) and the shift slide spacer (13).

1. Escapement Assembly
2. Screw-Escapement
3. Spring-Escapement
4. Key Assembly-Winding
5. Pin-Taper (See Parts)
6. Gear Assembly-Master
7. Dial-Shutter
8. Slide-Shift
9. Screw-Machine (See Parts List)
10. Washer-Lock (See Parts List)
11. Spring-Shift Slide
12. Plate-Shift Slide
13. Spacer-Shift Slide
14. Spring-Governor
15. Governor Complete
15A. Screw-Machine (See Parts List)
15B. Nut-Machine (See Parts List)
15C. Washer-Lock (See Parts List)
15D. Bracket Assembly-Top
15E. Pinion Assembly-Governor
15F. Shoe-Governor
15G. Washer-Flat (See Parts List)
15H. Washer-Flat (See Parts List)
15J. Bracket Assembly-Bottom
16. Strip-Light Seal
17. Plate Assembly
17A. Lever Assembly-Retard Cam
17B. Stud-Retard Stand

NOTE: Do not remove governor complete (15) from the plate unless necessary.

c) Governor. Disconnect the governor spring (14). Remove two hexagonal machine screw nuts (15B), two lock washers (15C) and machine screws (15A). Lift the top bracket assembly (15D) from the governor pinion assembly (15E) and take particuliar care to note the washers (15H) that may or may not be used. Remove the governor shoes (15F) from the pinion assembly. The bottom bracket assembly (15J) can now be removed from the plate.

d) Lever Assembly. If the retard cam lever assembly (17A) has become bent or damaged, drill out the brass stud (17B) using a No. 50 (.070 inch dia.) drill.

D. CURTAIN AND ROLLERS - REMOVAL AND DISASSEMBLY.

1. Remove the curtain and rollers assembly (10, figure 3). Shift the curtain and roller assembly to the right out of the camera case bearings and lift from the camera case. Do not lose spacer washers (11 and 12) that may or may not be used to prevent too much end play of the rollers. Do not disassemble the rollers from the curtain unless necessary. In the case of a defective roller, replace as a unit . . . do not disassemble.

E. FOCAL PLANE SHUTTER - CLEANING AND INSPECTION.

1. Shutter Plate Cover. Examine the shutter plate cover (2, figure 3) for dents that will obstruct the working of the dial slide (8) or governor assembly. Using a stiff brush, brush the fabric dust seal (4, figure 17) to remove dust and grit that may have collected.

2. Shutter Mechanism Plate Assembly. Clean all parts of the shutter plate (figure 18) with solvent, trichlorethylene (AN-T-37a). Dry all parts thoroughly before reassembly. Check the spring (3 and 14); replace if stretched or deformed. Inspect the gears for worn teeth and loose stop pins.

3. Curtain and Rollers. Examine the curtain for pin holes, tears or weak points near the struts. If the curtain and rollers have been disassembled, remove all old cement before assembly. Rough the brass rollers with very course sand paper. To check the curtain for distortion or stretching that will permit the curtain to run off the edge of the roller, when reassembled, hang the curtain so that the top roller is absolutely level; then check the edges to see that they hang absolutely perpendicular to within 1/4 inch at the base. Replace the curtain if it has been distorted or stretched.

CAUTION: Do not allow cleaning fluid, trichlorethylene, AN-T-37a, to contact rubber shutter curtain.

4. Contacts. Check the height of the receptacle contact (13, figure 21) and the receptacle jumper (21). Both of these must be arched above the wood surface at least 3/16 inch so that they will make positive contact with the receptacle contact studs (1, figure 17). Check the curvature of the spring finger contact (17, figure 3); these contacts should be arched evenly not more than 5/32 inch above the block. If the short and long switch contacts (17 and 19, figure 21) are causing an electrical short, remove the body release plate assembly (11), paragraph VI.A. and replace the contacts.

F. FOCAL PLANE SHUTTER - REASSEMBLY.

1. Focal Plane Shutter Contacts. Reposition the jumper assembly (20, figure 3) and form the right angle tabs at a slight arch so that they will make positive contact with case contact and jumper (13 and 15, figure 21). Slip the spring finger contacts (17, figure 3) into the grooves from the back of the right contact block (16). Replace the machine screws (18) at the top and bottom of the right block.

2. Roller and Curtain Assembly. Assemble the gear roller to the curtain at the end which has the largest aperture. The tension drive roller is assembled to the end of the curtain having the narrowed slits. The silvered contacts are on the right curtain edge facing the spring finger contacts (17).

a) Check the ends of the curtain for squareness; then apply cement (MIL-C-4003) to the rollers and curtain ends.

b) Attach the ends of the curtain to the rollers; it is essential that the ends of the curtain be placed parallel to the longitudinal axis of the rollers to insure proper alignment in the roll-up.

NOTE: Do not replace the curtain in the camera until the cement is firmly set.

3. Shutter Mechanism Plate Reassembly (figure 18). If the governor complete (15), has been dismantled, lubricate by wiping the outside ends of the governor shoes (15F) and governor pinion assembly (15E) with graphite powder, AN-G-24. The governor shoes must slide freely on the cross shaft of the pinion assembly. Reassemble the governor as follows:

a) Position the bottom bracket assembly (15J) on the lower cut-out of the plate assembly (17).

b) Assemble washers (15G), governor shoes (15F) to the pinion assembly (15E) and any washers (15H) that may have been used, in position between the top and bottom bracket assembly (15D and 15J).

c) Secure the bracket assembly with two machined screws (15A and secure with lock washers (15C) and machine nuts (15B).

d) Hook the governor spring (14) to the bottom bracket assembly (15J) and to the lower stud on the plate assembly (17).

4. Plate Assembly.

a) Assemble the lock washer (10), the shift slide spring (11), the shift slide plate (12) and the shift slide spacer (13) on the machine screw. Position this assembly in the long slot and screw on the shift side. Turn the shift slide (8) to a vertical position and tighten the machine screw.

b) Position the shutter dial (7) on its boss at the back of the plate.

c) Lubricate the master gear (6) lightly with grease Mil-G-3278 and insert. Make sure that the stem gears mesh with the shutter dial.

d) Note the taper of the pin hole of the winding key assembly (4) and position it on the master gear shaft to coincide with the taper of that hole. Assemble taper pin (5) and set the pin with a drive punch and light hammer.

e) Attach the escapement spring (3) to the necked stud of the escapement assembly (1) attached to the stud at the back of the plate assembly (17). Position the escapement (1) over its bosses and assemble the escapement screw (2).

f) With the escapement in release position (up) make sure that the master gear stop pins cannot snap back beneath the escapement brake springs; if the latch is not positive, bend the tip of the escapement brake spring down so that it snaps 1/32 inch below the top of the stop pin.

g) Lubricate the escapement brake springs and the escapement slide slots with grease, AN-G-6.

5. Focal Plane Shutter, Mounting and Timing.

a) Position the curtain and rollers assembly (10, figure 3) after lubricating the bearings of the rollers with grease, Mil-G-3278

b) Wind the curtain so that the open "0" aperature is showing.

c) Rotate the winding key until "0" appears squarely in the upper half of the speed shutter dial window (5, figure 17) when the upper master gear pin is stopped against the top step of the escapement (1) figure 18).

d) With the bottom strut of the curtain 1/4 inch from the upper, inside edge of the frame, position the shutter mechanism plate assembly (5, figure 3) over the pinion ends of the curtain rollers (10). The escapement actuating lever of the concealed body release plate must contact the bottom stud of the escapement assembly (1, figure 18) and the shutter selector shift slide and the shutter selector lever of the concealed body release (located near the middle) must contact the bottom shift plate slide (12). The gear of the top roller meshes with the master gear assembly (6).

e) Swing the retard cam lever assembly (17A) forward to raise the governor complete (15). Drop the bearing shaft of the tension roller in the lower bearing hole of the plate (17). At the forward edge of the plate is a narrow cut-out which fits with a raised lip of the concealed body release plate.

f) Note the horizontal side play of each roller. If necessary shim top roller with washers (11 and 12, figure 3) to limit end play to 0.020 inch maximum-0.010 inch minimum. Not more than one washer (11) to be used on pinion end. Shim left end of bottom roller with same number of washers (11 and 12). No washers used on right end of bottom roller.

g) With a screw driver, obtain tension on the lower roller by winding the slotted shaft counter clockwise. Hold the roller and pull the curtain out by hand several times to remove the cloth slack; then release the spring tension slowly.

h) Position the tension shaft retainer (7, figure 3) over the shaft and start the shaft retainer screw (6). Draw a pencil line on the retainer, and using this as an index, wind the slotted shaft counter clockwise 5 to 8 turns.

i) Tighten the shaft retainer screw so that the screw shoulder fits into the tension shaft retainer cut-out edge.

> CAUTION: If it is necessary to wind the initial tension more than the prescribed number of turns check for possible area of binding. Check roller bearing, master gear, and governor.

j) Wind and release the full length of the curtain several times. Check the distance of the top strut of the open aperture from the top inside edge of the case. If this distance is not 1/4 inch from the bottom of the curtain strut to the upper, inside edge of the frame it will be necessary to change the gear positions of the upper roller and the master gear assembly. To correct this gear position, remove the wood screws (9, figure 3) lift the upper edge of the shutter mechanism plate assembly, and raise or lower the mesh of the gears by one or two teeth as necessary.

k) Check the strut position after relocation and reassemble the wood screws (9).

l) Replace the shutter plate cover assembly (2) and assemble two wood screws (4) at the top and four machine screws (3) at the bottom.

m) Lay the camera face down and draw a pencil line across the center of the top roller; lift the curtain and apply, below the line that shows, a thin film of cement, MIL-C-4003, about 1/2 inch wide.

n) Wind the curtain until the smallest slit is at the top. Repeat the top curtain cementing procedure on the bottom roller.

o). Arch the spring finger contacts (17) at least 3/16 inch above the block. The arch must be curved evenly and as long as permissable.

p) Assemble the camera back (17, figure 1).

6. Focal Plane Shutter Check. Check focal plane shutter speeds as follows:

a) Set the shutter at the open "0" aperature; with the camera either horizontal or vertical, the shutter opening should move slowly and smoothly across the camera. The curtain should latch in this position. when the shutter release is depressed. The winding key should lock and not rotate.

b) If the curtain movement is not smooth and even, and if the curtain does not latch when the movement is completed, the tension of the lower roller must be increased as described in paragraph III.F.5. The tension should be added and checked by half turns above the turns prescribed.

c) If the equipment is available, the shutter should be tested further and more accurately with an electronic tester or stroboscopic light source.

d) Check the flash contact of the curtain by inserting a test lamp in the battery case. Contact should be tested at settings of 1000, 500, 250, and 0. See paragraph III.A. for operational procedure.

IV. FRONT STANDARD

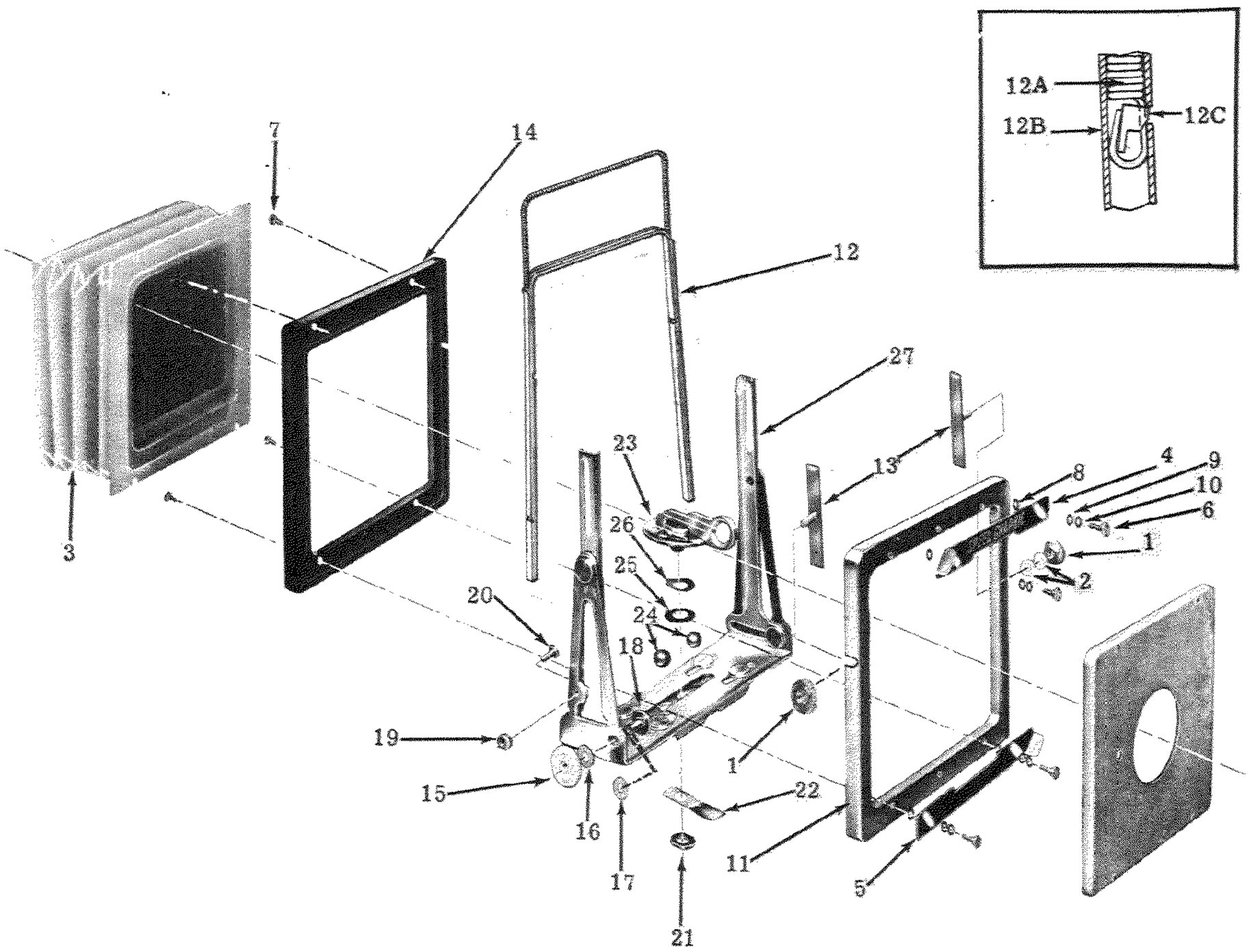


Figure 19. Front Standard Complete

1. Knob
2. Washer-Flat (See Parts List)
3. Bellows Complete
4. Lock- Lensboard Upper
5. Lock-Lensboard Lower
6. Screw-Lensboard Lock
7. Nut-Lensboard Lock
8. Washer-Flat (See Parts List)
9. Washer-Flat (See Parts List)
10. Washer-Spring (See Parts List
11. Frame Assembly-Outer Front
12. Finder Complete
12A. Finder Assembly
12B. Frame-Finder
12C. Stop-Finder
13. Plate Assembly-Front Frame Clamp
14. Frame-Inner Front
15. Knob-Support Locking
16. Washer-Flat (See Parts List)
17. Washer-Flat (See Parts List)
18. Screw-Support Locking
19. Nut-Front Standard Eccentric
20. Eccentric-Front Standard
21. Nut-Locking Disc Screw
22. Spring-Shift Locking
23. Lever Assembly
24. Ball
25. Washer-Flat (See Parts List)
26. Washer-Spring (See Parts List)
27. Standard Support Assembly

A. FRONT STANDARD DISASSEMBLY.

NOTE: If it is not necessary to remove the bellows assembly (3, figure 19), slide the front standard from the bed and proceed from paragraph C.

1. Bellows Removal.

a) Remove the camera back.

b) Open the camera bed (33, figure 3) and snap into normal position.

c) Set the curtain at "0", (open), and remove the two bellows retaining clips (23).

d) To remove the bellows from the frame and support section, remove the lower slidelock (5, figure 19) that is secured by two slidelock screws (6). Loosen the two upper slidelock screws (6). Swing the lower edge of the front bellows frame back and drop the upper edge free from the slidelock nut head.

2. Cable Release Assembly, Removal. To replace the cable release assembly (27, figure 3) proceed as follows:

a) Remove the frame clamp knob (rising front) (1, figure 19) from the right side of the front standard. Slip the manual trip bracket (27C, figure 3) from the stud.

1) Release pressure of spring (24, figure 3) by removing wood screw (25) and washer (26). From the cable release lever assembly (30) remove the mounting screw (31). Remove two wood screws (29 and 28) from the cable mounting clip. Slip the terminal end of the cable through the bellows hangers to free the cable release assembly.

3. Front Sight Disassembly.

a) Remove two rising front knobs (1, figure 19) from each side of the frame. The ends of the stud securing knobs are staked. Remove the upper and lower slidelocks (4 and 5) that are attached by slidelock screw (6) flat washers (8 and 9) and spring washer (10).

b) Spread the standard support assembly (27) enough to slide the lensboard frame upward and free of the channel.

c) Lift the outer front frame assembly (11) evenly from the assembly to expose the inner parts of the frame and remove the finder complete (12).

4) Lateral Shift Spring and Lock Lever Disassembly. The lever assembly (23) and the shift locking spring (22) are secured by the special hex nut (21). Unscrew the special nut (21) from the bottom of the standard support assembly (27). The shift locking spring may now be removed. Unscrew the slotted stud of the lever assembly (23) taking care not to lose the steel lock balls (24), one flat washer (25) and one spring washer (26).

B. FRONT STANDARD AND BELLOWS INSPECTION AND CLEANING.

1. The bellows (3) should be wiped free of dirt on the outside with a damp cloth. Scrub the inside surface with a stiff brush (old toothbrush) and blow out all loose dirt and grit.

2. Inspect the finder (12A) or finder frame (12B) for bends, if bent, replace.

3. Clean the sliding area of the finder (12A, figure 19), the finder frame (12B) and the front frame clamp plate assemblies (13) in solvent (AN-T-37a) and dry before reassembly.

4. Squareness adjustment is set by the front standard eccentric (20) and special lock head nut (19) located on each side.

NOTE: A height gauge, surface gauge, with dial indicator, parallel blocks, and a surface plate should be used for this adjustment.

5. Remove the focusing panel. Set the camera back on the parallel blocks, pull the front standard forward on the bed against both infinity stops and lock. Check the height with indicator at each corner and adjust the eccentrics (20) or relocate the infinity stop (15 or 16, figure 1).

C. FRONT STANDARD AND BELLOWS REPAIR.

1. Stretch the bellows to its full extension and inspect for pin holes by inserting an electric light bulb inside, being careful not to burn the inside fabric.

2. Inspect finder complete (12, figure 19) for squareness.

D. FRONT STANDARD REASSEMBLY.

1. Lateral Shift and Lock Lever. To the lever assembly (23, figure 19) assemble the spring washer (26) and the flat washer (25). Fit the two steel balls (24) into their position between the lever assembly (23) and the standard support assembly (27) and thread the lever assembly stud through the standard support assembly. Lay the shift locking spring (22) in position and assemble the special hexagon nut (21).

2. Adjusting Lock Lever. Check the front standard to determine how tightly it will lock, by placing on the sliding yoke of the bed and setting the lock lever (23). It should clamp tightly enough to prevent slippage when the bellows and lens are assembled. To tighten the lock lever, loosen the lock nut (21) on the bottom side and turn the screw in a counter clockwise direction; to loosen the lock, turn the screw in a clockwise direction and tighten the nut.

3. Lensboard Frame and Sight Reassembly. Lubricate the flat surface of each front frame clamp plate assembly (13) with grease, AN-G-6. Lubricate the sliding areas of the finder (12A) and the finder frame (12B) with grease, AN-G-6.

a) To the outer front frame assembly (11) assemble the front frame clamp plate assembly (13) on each side and assemble the finder complete (12). Assemble the inner front frame (14) to this assembly and position the upper slide lock nuts (7) to the top rear holes. Position the flat washers (8), lay the upper slidelock (4) in position and assemble the slidelock screw (6) that has been fitted with spring washer (10) and flat washer (9).

b) Attach the frame assembly to the bellows by sliding the top edge of the front bellows frame under the slide lock nuts (7). Swing the lower edge of the front bellows frame against the frame and assemble the lower slide lock nuts (7) through the lower bellows frame slots. Assemble the lower slidelock (5) and its attaching parts.

c) To assemble the lensboard frame assembly to the standard support assembly (27) spread the upright channels and drop the lensboard frame into position with the threaded studs of the front frame clamp assembly (13) extending through the vertical section. To the stud on the left side, assemble two flat fibre washers (2) and a frame clamp knob (1). Peen the first thread lightly to prevent loss of the knob.

4. Cable Release Replacement. Attach the cable release assembly (27, figure 3) as follows:

a) Attach the cable mounting clip with wood screws (28 and 29, figure 3). Position the fork of the cable release lever (30) around the stud of the body release lever, which extends inside the case, and assemble the lever mounting screw (31) at the bottom of the cable release lever. Assemble the special screw (32) to secure the lever fork in position with the body release lever stud. Assemble the washer (26) through the wood screw (25) and anchor the large loop end of the spring (24).

b) Thread the manual trip bracket (27C, figure 3) through the bellows hangers and mount the bracket over the right front frame clamp plate stud. Assemble the frame clamp knob (1, figure 19) and peen the first thread of the stud at one point.

5. Bellows Replacement. Attach the front bellows frame as instructed in paragraph IV.D.3.b. above.

a) Hook the rear bellows frame inside of the camera case frame and secure with two bellows retaining clips (23, figure 3). Assemble clips with dimpled side toward back of camera.

b) Replace the camera back (17, figure 1) as instructed in paragraph II.C.3.d.

6. Cable Release Adjustment.

a) The manual trip clamp (12, figure 1) is clamped to the manual trip rod (27B, figure 3) and the relationship of the manual trip clamp to the shutter release lever is adjusted by means of the twin cable release nuts (27A).

b) Set the shutter shift slide (8, figure 18) so that the raised portion of the slide is opposite "FRONT". Trip the shutter from the body shutter release (11, figure 21). The shutter should be capable of tripping from any position of the front standard from minimum to maximum bellows extension . . start preliminary adjustments with the minimum bellows extension and adjust the height of the manual trip rod so that the body release is set with the minimum travel.

V. BED COMPLETE

Key to Figure 20.

1. Guide-Right
2. Screw-Special
3. Screw-Special
4. Lever-Yoke Lock
5. Washer-Flat (See Parts List)
6. Sleeve-Yoke Lock
7. Yoke Assembly
7A. Yoke-Bed Section
7B. Yoke-Case Section
7C. Link-Yoke
7D. Pin-Link
8. Block-Right Bed
9. Screw-Special
10. Spring-Bed Brace
11. Plunger-Bed Brace
12. Clip-Spring Retaining
13. Shaft Assembly-Pinion
13A. Screw-Set (See Parts List)
13B. Pad-Yoke Lock
13C. Knob-Focusing
13D. Post-Yoke Lock
13E. Pinion-Focusing
14. Spring-Pinion
15. Escutcheon - Bed
16. Bed Assembly-Second
16A. Brace Assembly-Left
16B. Brace Assembly-Right
16C. Rivet-Bed Brace Assembly
16D. Bushing-Guide and Blick Screw
16E. Spring
16F. Pin-Hinge (See Parts List)
17. Hinge Assembly
17A. Guide-Case Right
17B. Pin-Dowel (See Parts List)
17C. Ring-Retaining - Tripod Socket

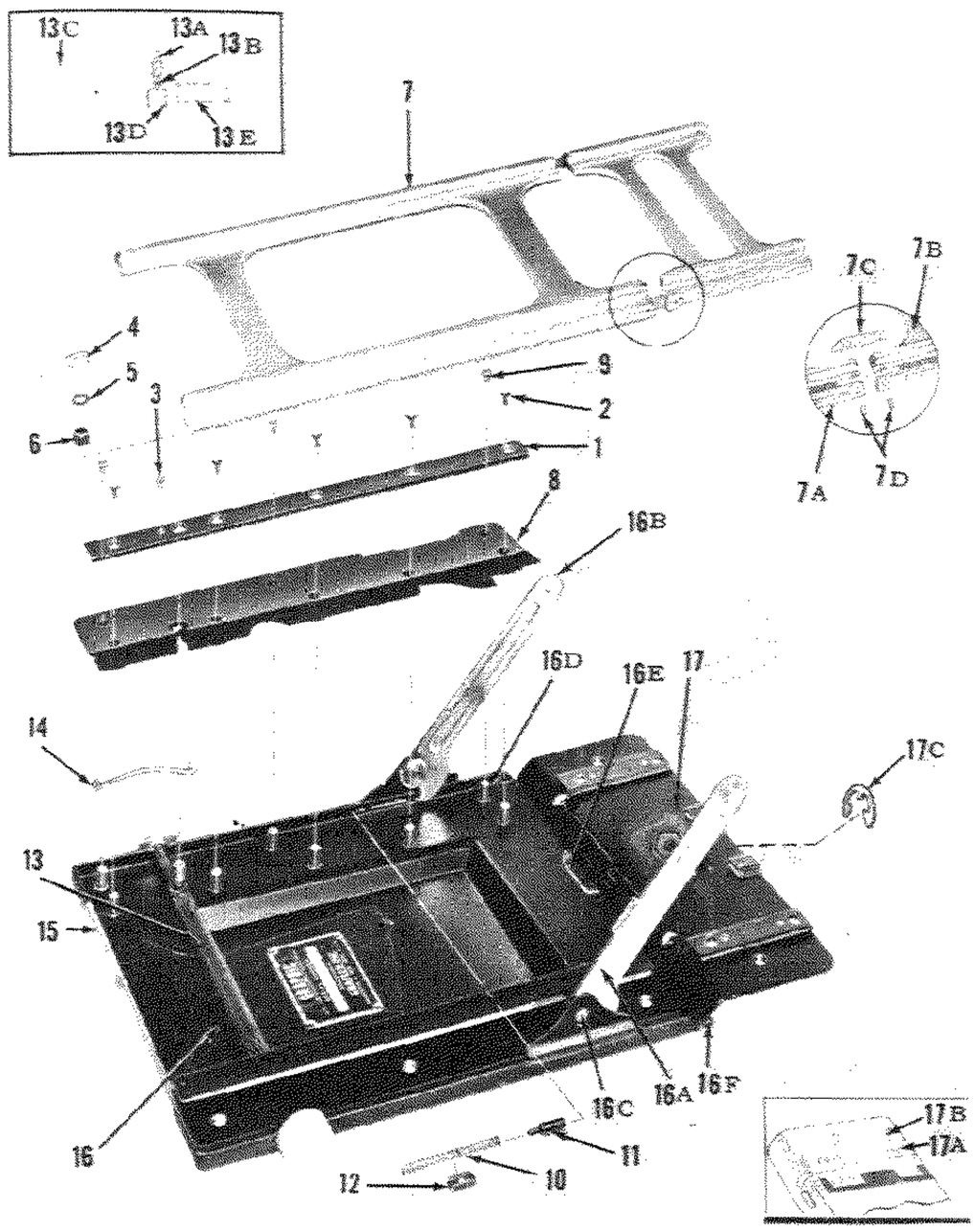


Figure 20. Bed Complete

A. BED DISASSEMBLY.

1. Removal. If it is not necessary to remove the bed (33, figure 3) from the camera body proceed from paragraph V.2. below.

a) Slide the front standard (22) forward and free of the bed yoke.

NOTE: If bellows assembly is to be removed refer to paragraph IV.1.

b) Remove the right and left bed brace plates (34 and 35, figure 3) that are secured by screws as illustrated.

CAUTION: Hold the plate to prevent stripping the last few wood screw holes as the bed brace arms are under spring tension.

c) From the bed hinge, remove two wood screws (38). Remove four yoke guide case screws (39) that are screwed into machine nuts (2, figure 21) located in the case feet (1).

d) Lift the bed from the camera case.

2. Disassembly. Open the bed but do not lock in a horizontal position, allowing the bed to slide freely in the bed brace plates (34 and 35, figure 3). Disassemble the left side first.

a) Remove the focusing scale (7, figure 1).

b) Remove the bed section guide (1, figure 20) by removing machine screws (2).

c) Rack the yoke assembly (7) forward until the rear case yoke section is free of the hinge guides. Lift the yoke assembly (7) from the bed.

d) Remove block screws (9, figure 20) from the bed block (8). When the bed block is lifted from its position care should be taken so that the bed brace spring (10) does not throw and lose the bed brace plunger (11).

e) Swing the yoke lock lever (4, figure 20) clockwise so that the special fillister head screw (3) can be removed. Unscrew the yoke lock lever (4). Remove the flat washer (5) and the yoke lock sleeve (6).

f) Follow the above steps for right side disassembly.

g) Lift the pinion assembly (13) from the bed. Do not lose the focusing pinion springs (14) at each side.

NOTE: Do not disassemble the yoke assembly (7), the pinion assembly (13), or the bed assembly (15).

B. BED CLEANING AND INSPECTION.

1. Clean the bed, the bed blocks, and the bed section guides with a cloth moistened in solvent. Wash all other metal parts in solvent, trichlorethylene AN-T-37a and dry thoroughly.

2. Check the top surface of the bed blocks (8) with a straight edge to be sure they are absolutely flat. Check the bed section guide (1) for straightness. Check the yoke assembly for flatness in all directions.

3. Check the bed hinge for smooth operation and no binding. Replace if the hinge binds.

4. Re-cement loose leather with adhesive MIL-C-4003, assuring that the edge of the leather is bound beneath the bed block.

C. BED REASSEMBLY.

1. Hinge. Use grease, AN-G-6, and lubricate the following hinge parts.

a) The case section guide (17A, figure 20) should have the sliding grooves wiped with a film of the above lubricant.

b) Assemble the case section guide (17A) to the hinge assembly (17) by using two dowel pins (17B) in each guide.

c) After the bed is assembled to the camera and checked by sliding the front standard from the bed to the hinge section, it may be found necessary to shim the case section guide, see paragraph V.C.7.

PACEMAKER GRAPHIC "45" SPEED & CROWN WITH GRAPHIC RANGEFINDER (1955-)

2. Focusing Pinion Reassembly.

a) Position the focusing pinion assembly (13) in the bed with the yoke lock post (13D) on the right hand side. Position the focusing pinion spring (14) at the extreme inside end of the pinion.

b) Hold the pinion in position at this time by snapping a rubber band around the knob, across the outside of the bed and around the other knob.

Lubrication Note: Use grease, AN-G-6, as follows:

Pinion assembly (13, figure 20) should be lubricated by wiping the small diameter of the shaft at each end with a resonable amount being applied to the helical gear teeth.

The yoke assembly (7, figure 20) should have its guide edges wiped with lubricant and a reasonable amount applied to the gear teeth. Roll the yoke assembly (7) over the pinion assembly (13) to distribute the lubricant evenly and wipe off all excess.

Lubricate the sliding groove of the right and left bed section guide (1).

3. Block Assembly.

a) To assemble the bed block (8, figure 20) insert the stud of bed brace plunger (11) into the bed brace spring into space provided on the under side of the bed block and hold in position by use of the spring retaining clip (12) that clips around the spring and over the rib on the bottom of the block. Check the position of the focusing pinion spring (14) so that it will fit in the block cavity that is provided. Lower the block into position over the guide and block screw bushings (16D). Be sure that the edge of the leather is tucked in between the block and the bed. Assemble three bed block screws (9).

b) Assemble the opposite bed block as instructed in the preceding paragraphs.

4. Yoke Lock Lever.

a) Assemble the right bed section guide (1, figure 20) and attach with five machine screws (2).

b) Insert the yoke lock sleeve (6) and assemble the flat washer (5), if required. This flat washer is a spacer washer that may or may not be needed, depending on the position of the yoke lock lever when it is assembled.

c) Assemble the yoke lock lever (4) and tighten. Note the position and if the lever does not tighten in convenient position it should be removed and the thread started in a different position; it has a triple lead thread. If it is not possible by trial and error to have the lever lock in a convenient position, one or more of the flat washers (5) should be positioned above the yoke lock.

d) After the yoke lock lever position has been found to be satisfactory, assemble the special fillister head screw (3).

5. Guide Assembly and Adjustment.

a) Position the yoke assembly forward so that the bed section guide will engage both the bed and case section of the yoke.

b) Position the left bed section guide and assemble five machine screws (2, figure 20).

c) With the bed section guide screw (2) loosened on both sides, slide the yoke back so that the case section will partially engage in the case section guide (17A). This will center the front section in relation to the case section. Draw both bed section guides (1) together evenly with the fingers and tighten the guide screws (2) on both sides.

d) Check the assembly at this point by sliding the yoke assembly back and forth several times. It should work smoothly without binding or jumping. There should be enough side tension so that the yoke will not slide by itself when the bed is held vertically.

e) It may be necessary to readjust the guides or to increase the tension on the yoke lock post (13D). Tighten the center set screw (13A). If the set screw can not be tightened enough it will be necessary to add an additional yoke lock pad (13B) beneath the set screw.

6. Bed Reassembly to Camera.

a) Place the bed in position in the camera case and reassemble four yoke guide case screws (39, figure 3) that are screwed into the machine nut (2, figure 21) located in the foot (1). Assemble two wood screws (38, figure 3).

b) Engage each bed brace (16A and 16B, figure 20) with its proper bed brace plate (34 and 35, figure 3). Allow the bed brace arm to slide freely in the slot and assemble the mounting screw in the old mounting hole.

NOTE: If any of the mounting holes have been stripped or become enlarged they should be plugged with a hard wood dowel that is cemented in place; use Federal Specification C-G-451.

c) Attach the left bed brace plate (34, figure 3) with five wood screws (37). Attach the right bed brace plate (35) with one wood screw (37) at the top and four wood screws (36) at the bottom.

7. Checking Bed Alignment.

a) Test the bed with a straight edge to make certain that it is level with the bottom of the case. Lay the straight edge across the bed emboss to the camera bottom. The bed brace plates may have to be moved up or down slightly to attain this level. If adjustment is necessary, first loosen the screws and try to obtain alignment without completely removing the plate.

b) Secondly, lay the straight edge across the bed section guide and case section guide.

1. Loosen the case yoke guide screws (39, figure 3) and slip the blade of a knife beneath the guide to raise it enough to insert the necessary number of shims (40, figure 3).

2. The case yoke guide shim (40) is available in three thicknesses; 0.016 inch, 0.0040 inch and 0.0060 inch thick; adjust as necessary by trial and error until the top surface of the yokes are level.

VI. BODY COMPLETE

c) Next check the top surface of the yoke assembly (7, figure 20). If the top surfaces of the yoke guide are not level, the front standard will not slide smoothly on the yoke. If necessary, shim the case section guide as follows:

A. BODY RELEASE PLATE DISASSEMBLY.

1. Remove the release slide plate (11, figure 21).
2. Remove the right focusing knob escutcheon (51, figure 3) that is held by escutcheon pin (52). Pry up the right moulding (9, figure 21) and the right edge of the lower right moulding (8).

> CAUTION: Extreme care should be taken when the moulding is removed to avoid splitting the edge of the case when breaking the glue that holds the moulding.

3. Remove the shutter plate cover assembly (2, figure 3) and shutter mechanism plate assembly (5), see paragraphs III.B.and C.

4. With a sharp knife cut the leather below the shutter plate cut-out to the bottom corner of the camera. Cut along the lower camera corner to the front edge. Pull the leather up as far as the focusing knob cut-out.

5. From the body cable release, remove the special screw (32, figure 3).

6. Remove six wood screws (12, figure 21) that secure the body release plate assembly (11), and remove the plate assembly.

B. BODY RELEASE PLATE, CLEANING AND INSPECTION.

1. Inspect the sliding action of the shutter selector shift slide located near the back center of the plate. Pull the slide down against the spring action assuring that it returns freely, without binding or catching. All levers on the back of the plate should work freely without interference or binding.

2. Inspect the short and long switch contacts (17 and 19, figure 21). These contacts complete the focal plane synchronization circuit and are closed by pressure action of the long lever inside the plate that has the insulated spring terminal bushing. If this insulated bushing has become worn so that the lever might make contact with the short switch contact (17) the body release plate assembly (11) must be replaced.

3. Wash the body release plate assembly in solvent, trichlorethylene (AN-T-37a), and dry thoroughly. Lubricate with graphite powder, AN-G-24.

C. BODY RELEASE PLATE REPLACEMENT.

1. Position the body release plate assembly (11, figure 21) and assemble six wood screws (12).

2. Apply adhesive, MIL-C-4003, to the leather and to the body release plate and edges of the wooden case. Allow the adhesive to dry enough to become tacky and smooth the leather covering back into place.

3. Using the edge of a knife, work adhesive into the slots at the front edge of the case, and replace the right moulding (9) and the lower right moulding (8). Replace the right focusing knob escutcheon (51, figure 3) that is secured with the escutcheon pin (52).

4. Reassemble the focal plane shutter mechanism plate and adjust the timing as instructed in paragraphs III.F.4 and 5.

5. Replace the special screw (32 figure 3).

D. TRIPOD SOCKET REPLACEMENT.

1. To remove the side tripod socket (26, figure 21) it is first necessary to remove the right bed brace plate (35, figure 3) as described in paragraph V.B.2. Remove the three flat head wood screws (27 figure 21) securing the tripod socket.

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER (1955-)

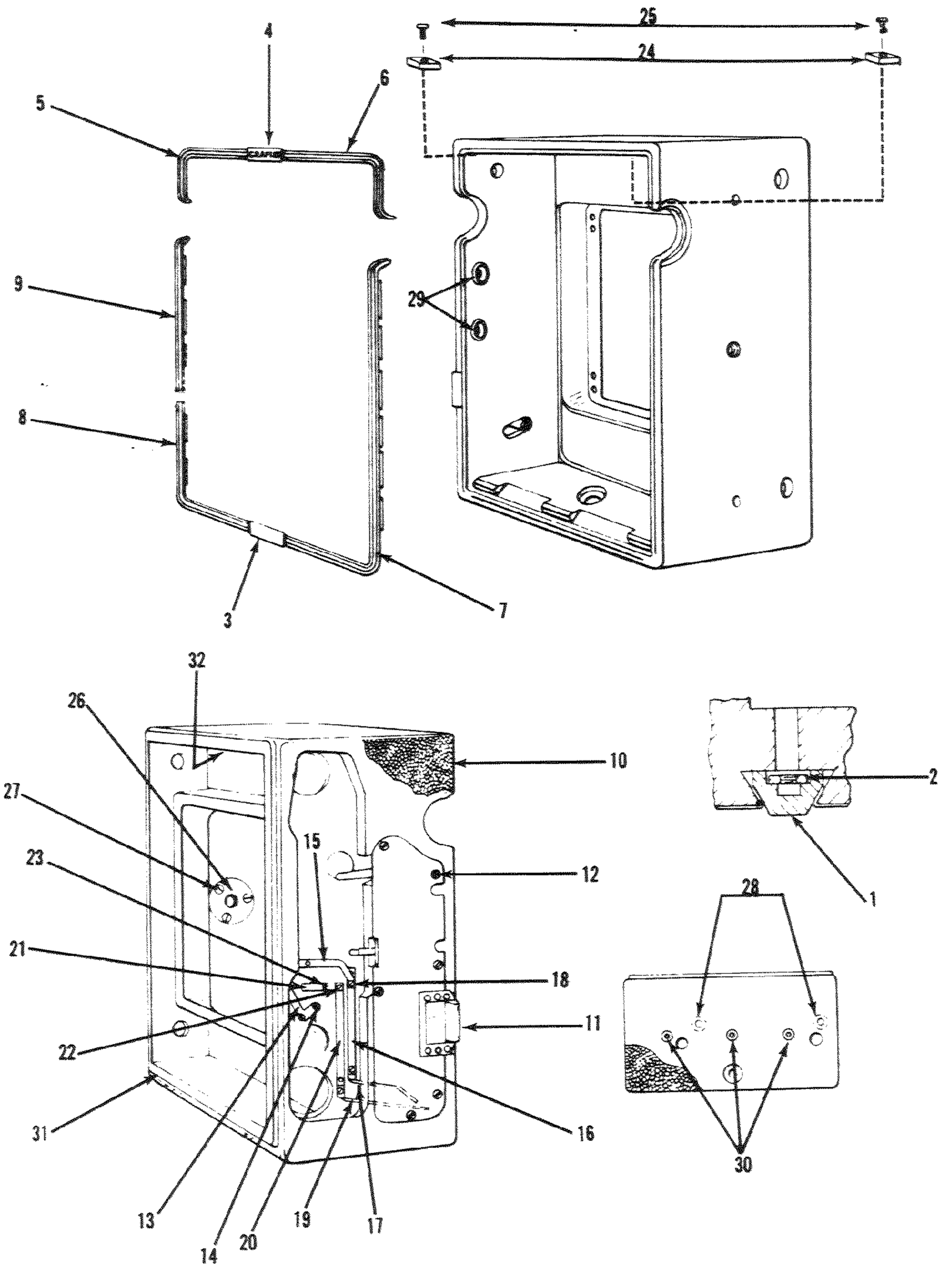


Figure 21. BODY COMPLETE

Key to figure 21.

1. Foot
2. Nut-Machine (See Parts List)
3. Plate-Lower Moulding (Plain)
4. Plate-Upper Moulding ("Graflex")
5. Moulding-Upper Right
6. Moulding-Upper Left
7. Moulding-Lower Left
8. Moulding-Lower Right
9. Moulding-Right
10. Covering
11. Plate Assembly-Body Release
12. Screw-Wood (See Parts List)
13. Contact-Receptacle
14. Screw-Wood (See Parts List)
15. Jumper
16. Jumper-Switch
17. Contact-Short
18. Screw-Wood (See Parts List)
19. Contact-Long
20. Jumper-Switch
21. Jumper-Receptacle
22. Screw-Wood (See Parts List)
23. Pin-Escutcheon (See Parts List)
24. Stop-Bed
25. Screw-Wood (See Parts List)
26. Socket-Side
27. Screw-Wood (See Parts List)
28. Insert-Housing
29. Insert-Encircling Bracket
30. Insert-Bracket-Tube and Latch
31. Insert-Case Bottom
32. Insert-Case Top

LUBRICATION, CLEANING SOLVENTS, ADHESIVES

Materials are specified for general reference by U. S. Government Specifications. If the recommended material cannot be located, local suppliers can advise a substitute that meets the specification numbered.

Compound	U.S. Government Specification	Manufacturer	Use or Application
LUBRICANTS			
Graphite-Micro fine	AN-G-24	Joseph Dixon Co. Division 48-C Jersey City 3, N.J.	Body release plate Shutter governor
Lubricant #SG4455	MIL-G-3278	Standard Oil of Indiana Chicago Illinois	Shutter master gear Shutter bearings Bed pinion teeth and bearings
#107 Lubriplate	AN-G-6	Fiske Bros.Refining Co.	Bed and front standard sliding surfaces. Peepsight Erecting Spring
CLEANING SOLVENTS			
Trichlorethylene (2nd Choice - Carbon tetrachloride)	AN-T-37a		Cleaning metal parts
ADHESIVES			
Adhesive 3M-EC-880	MIL-C-4003	Minnesota Mining and Manufacturing Co. Detroit, Michigan	Shutter curtain to roller Covering to body
#1 Ground Joint Glue	C-G-451 (Animal glue)	Peter Cooper Gowanda, New York	Wood to wood
Wood-Lok #3030	------	National Adhesive Co.	Rangefinder base seat washer (Early Model)
Glyptol #1276	------	General Electric Co. Pittsfield, Mass.	Base assembly bearing Rotating mirror lock nut Threads of small wood screws Threads of machine screws

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

PARTS LIST

The Group Assembly Parts Lists are listed in disassembly order. Each list divides the components into major assemblies, their subassemblies and parts. By the use of indented columns, the relationship of the assemblies to the subassemblies and parts is obtained.

The column titled "Figure and Index No." contains the index number in disassembly order of the items illustrated. Do NOT use the figure or index number in correspondence - specify the catalog or part number and name.

The column titled "Nomenclature" (including numbered columns) lists item nomenclature on the Graflex drawing. The assembly in the column marked "3" will be a component of the first assembly which preceded it in the column marked "2", etc. The code "NP" will indicate that this part is "not procurable" and that the "next higher assembly" (NHA) should be ordered. The code "AR" is used for bulk items when an indefinite amount may or may not be used "as required." The code "LP" is used when an item may be "locally purchased."

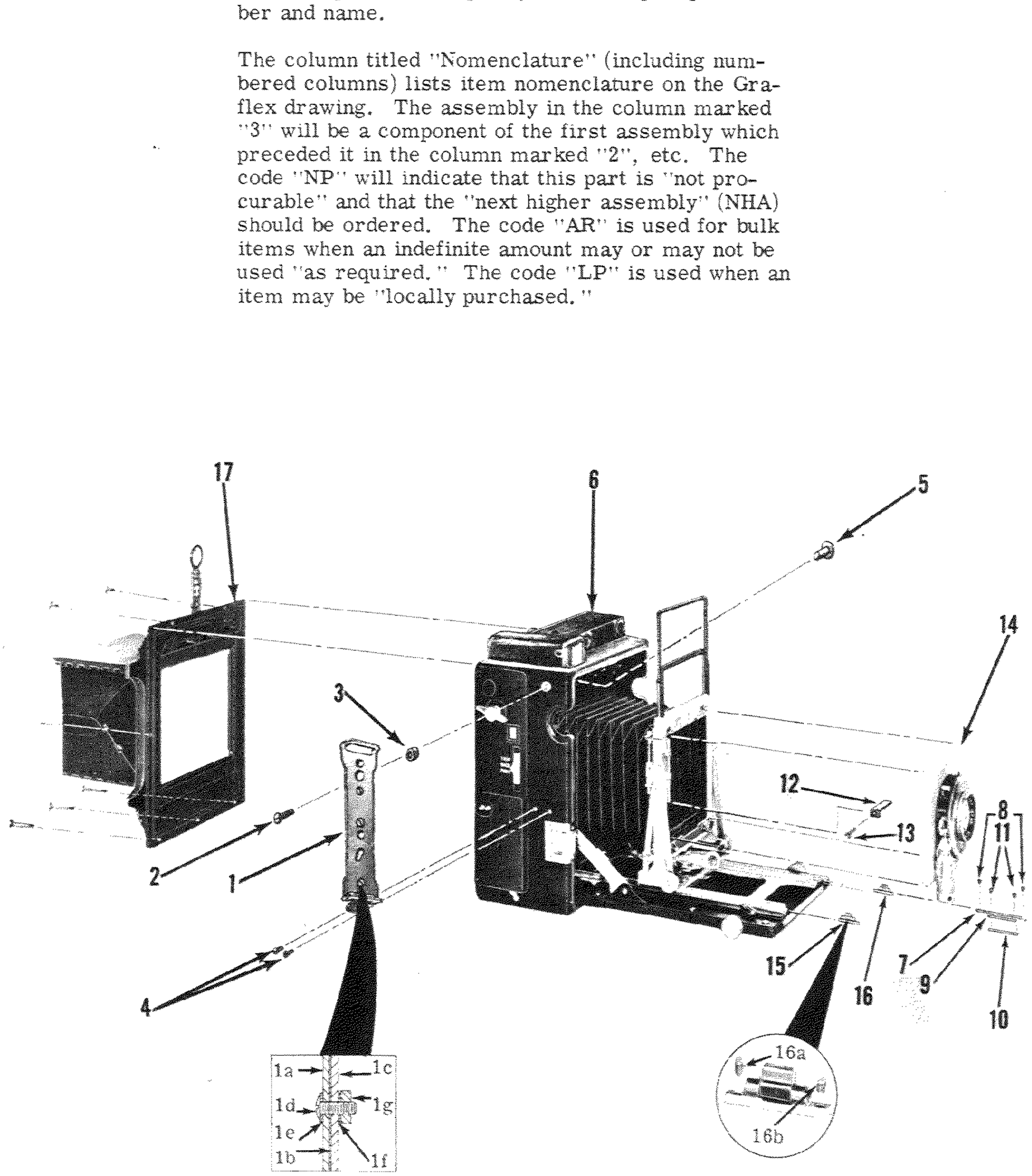


Figure 1. CAMERA COMPLETE

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
1-	34700G1	Camera Complete - Pacemaker Speed Graphic "45"	Ref.	
	34700G2	Camera Complete - Pacemaker Crown Graphic "45"	Ref	
-1	31284G1	. Bracket - Battery Case Mounting, Cat. No. 2755	1	
-1a	31114P1	. . Bracket - Outer	1	
-1b	31037P1	. . Insulator	1	
-1c	30723P2	. . Bracket - Inner	1	
	Attaching Parts			
-1d	104-4R5C	. . Screw - Machine, No. 4-40 x 5/16 oval hd	3	
-1e	30473-36	. . Washer - Flat, 0.250 x 0.115 x 0.025	3	
-1f	221-4	. . Washer - Lock, No. 4 internal tooth	3	
-1g	200B4HC	. . Nut - Machine, No. 4 hex	3	
	---***---			
	Attaching Parts			
-2	110-5-7C	. Screw - Machine, No. 5-40 x 7/16 binding hd	1	
-3	32090-16	. Spacer - Tubular, 0.281 x 0.133 x 0.150	1	
-4	34930P2	. Screw - Machine (special)	1	
-5	31129	. Nut (special)	1	
	---***---			
-6		. Graphic Rangefinder - Viewfinder, Rangelite (Figure 2)	Ref.	
-7	30881P43	. Scale - Focusing (124 to 129mm), uncalibrated	1	
	30881P44	. Scale - Focusing (135 to 152mm), uncalibrated	1	
		NOTE - Calibrated scales are not procurable separately. The lens must be sent to Graflex to be matched to actual lens focal length.		
	Attaching Part			
-8	30819	. Screw - Machine (special)	2	
	---***---			
-9	30817P2	. Scale - Index (127mm or longer focal length lenses)	1	
	30817P3	. Scale - Index (126mm or shorter focal length lenses)	1	
-10	30815	. Plate - Index Scale	1	
	Attaching Part			
-11	30819	. Screw - Machine (special)	2	
	---***---			
-12	31102P1	. Clamp - Manual Trip (No. 3 Shutters)	1	
	31102P3	. Clamp - Manual Trip (No. 2 Shutters)	1	
	31102P4	. Clamp - Manual Trip (No. 1 Shutters)	1	
	Attaching Part			
-13	107-2-2C	. Screw - Machine, No. 2-64 x 1/8 Fillister hd	1	
	---***---			
-14		. Lensboard & Shutter (as selected)	Ref.	
		. Stop Assembly - Right & Left, Infinity, Cat. No. 9100	1	
-15	30655G1	. . Stop Assembly - Right , Infinity	1	
-16	30655G2	. . Stop Assembly - Left, Infinity	1	
-16a	30661	. . . Screw - Infinity Stop, Pointed (rear)	2	
-16b	30662	. . . Screw - Infinity Stop, Flat (front)	2	
-17		. Back Complete - Graflok (Figure 9)	Ref.	
		. Camera Basic (Figure 3)	Ref.	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

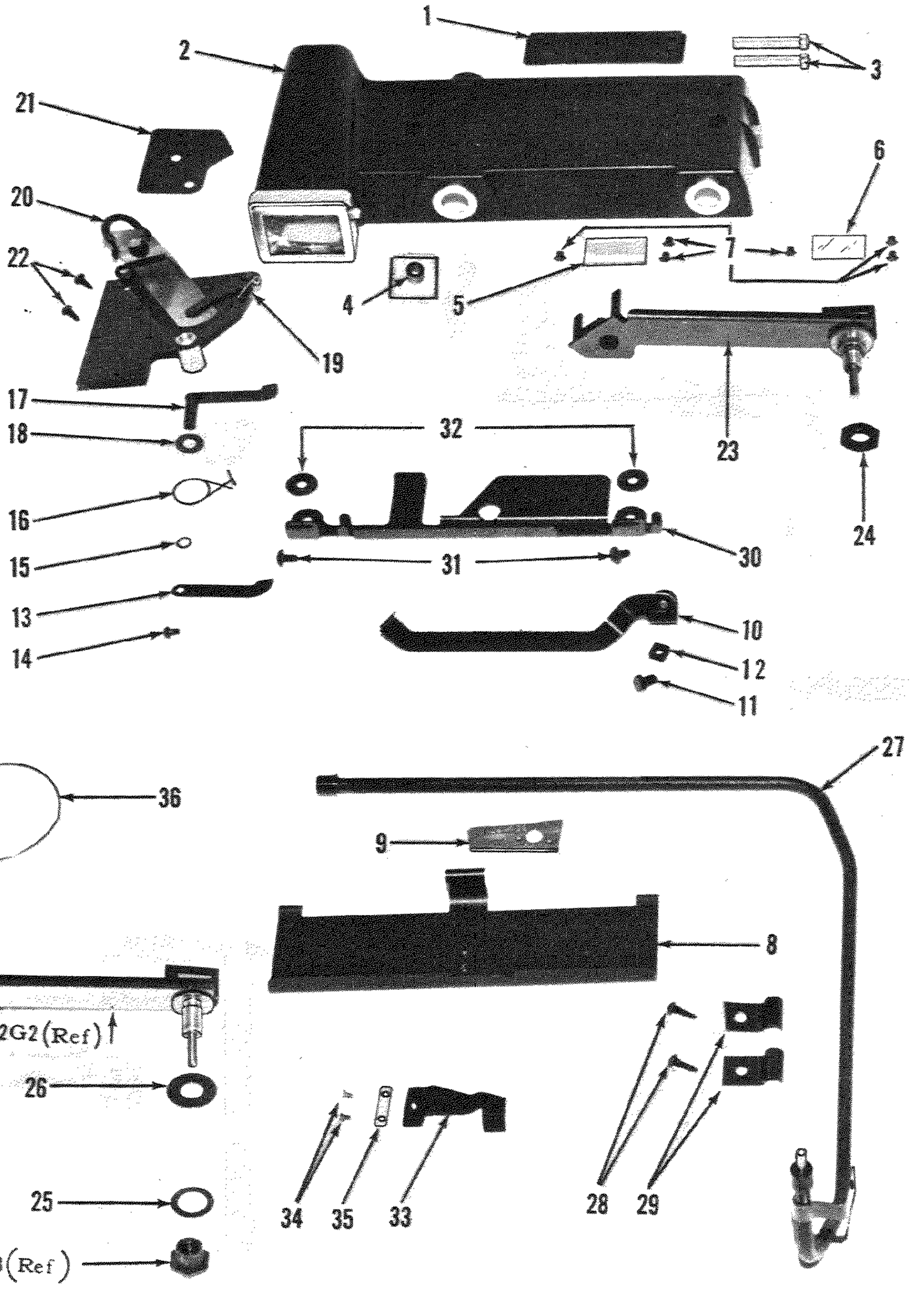


Figure 2. GRAPHIC VIEWFINDER - RANGEFINDER

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
2-		Graphic Rangefinder - Viewfinder, Rangelite	Ref.	
-1	34748G1	. Cover Assembly - Battery	1	
		. Battery, No. 915, Size AA, Nat'l Carbon Co. or equal	LP	
-2	34743G1	. Housing Complete - Rangefinder (Figure 2A)	1	
	Attaching Parts			
-3	106-6-14A	. Screw - Machine, No. 6-32 x 7/8 fillister hd	2	
-4	34847	. Spacer - Tubular (Early Models)	1	
	---***---			
-5	34711	. Mirror - Transparent	1	
-6	34712P1	. Mirror - Opaque	1	
	Attaching Parts			
-7	32416P1	. Retainer - Mirror	6	
	---***---			
-8	34768G1	. Cover Assembly - Cam	1	
-9		. Cam - Rangefinder (part number stamped on cam) selected to match the measured focal length of lens.	1	
-10	34734P1	. Arm - Rangefinder	1	
	Attaching Parts			
-11	30776	. Screw - Set (special)	1	
-12	34721	. Nut - Machine (special)	1	
	---***---			
-13	34733P1	. Lever - Inner, parallax actuating	1	
	Attaching Parts			
-14	102-2-2L	. Screw - Machine, No. 2-56 x 1/8 round hd	1	
-15	221-2L	. Washer - Lock, 0.180 x 0.092 x 0.013	1	
	---***---			
-16	34752	. Spring - Rangefinder Arm	1	
-17	34728G1	. Lever Assembly - Parallax	1	
-18	30473-78K	. Washer - Flat, 0.250 x 0.163 x 0.020	1	
-19	34760	. Spring - Parallax	1	
-20	34737G1	. Parallax Base Complete	1	
-21	34791	. Cover - Housing (Crown Graphic)	1	
	Attaching Part			
-22	151B2-4K	. Screw - Wood, No. 2 x 1/4 round hd	2	
	---***---			
-23	34939G2	. Base Complete - Mirror (Figure 2B) replaces p/n 34702G2	1	
	Attaching Parts			
-24	34934	. Nut - Machine (special) replaces 34713	1	
-25	35473-5L	. Washer - Flat (Early Model) 0.750 x 0.328 x 0.020	1	
-26	30473-68L	. Washer - Flat (Early Model) 0.593 x 0.265 x 0.032	1	
	---***---			
-27	34739G1	. Tube Assembly	1	
	34719	. . Clamp - Bottom	1	
	34718	. . Plunger Lower	1	
	34725P1	. . Cap	1	
	Attaching Parts			
-28	151B3-3K	. Screw - Wood, No. 3 x 3/16 round hd	3	
-29	34723P2	. Clamp - Tube, Upper	2	
	---***---			
-30	34724P1	. Bracket - Tube	1	
	Attaching Parts			
-31	112B3-3K	. Screw - Machine, No. 3-48 x 3/16 truss hd	2	
-32	30473-46K	. Washer - Flat, 0.375 x 0.109 x 0.040	2	
	---***---			
-33	36369G2	. Bracket Assembly (replaces 34715P1 includes set screw)	1	
	30661	. . Screw - Set (special)	1	
	34715P1	. Bracket - Rangefinder Actuating (replace with 36369G2)	Ref.	
	Attaching Parts			
-34	34932	. Screw - Machine (special) used with 34715P1	2	
-35	32432	. Plate - Clamp (used with 34715P1 - no longer available - replace with 36369G2)	Ref.	
	---***---			

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
2-36	34756P1	. Spring - Cam Retaining (No. 2&3 Shutters)	1	
	34756P2	. Spring - Cam Retaining (No. 2 Compur)	1	
	34784	. Spring - Cam Retaining (No. 1 Shutters)	1	

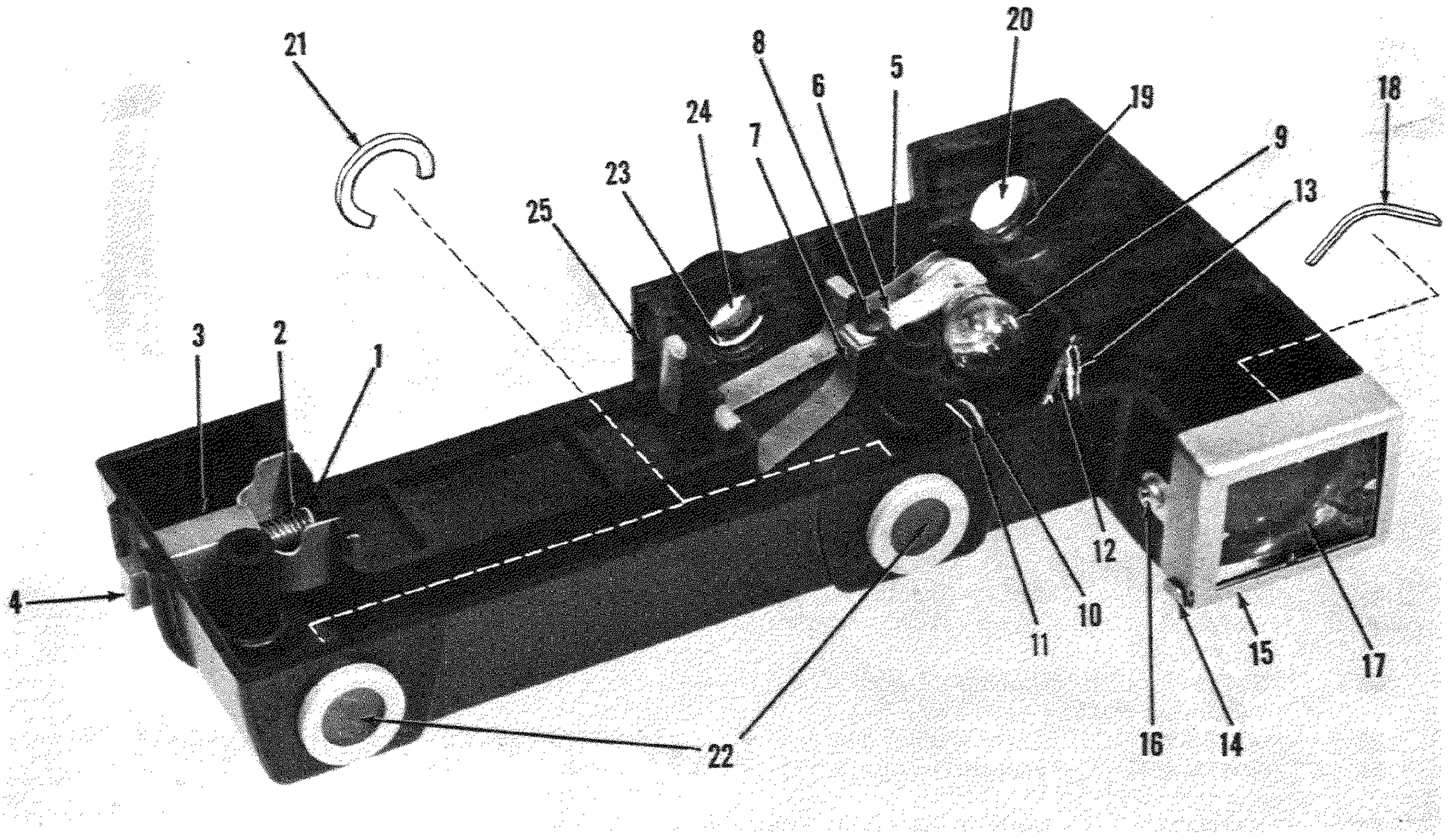


Figure 2A. RANGEFINDER HOUSING

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
2A-	34743G1	Housing Complete, Rangefinder	Ref.	
-1	30473-20	. Washer - Flat, 0.203 x 0.124 x 0.010	1	
-2	34759	. Spring - Switch	1	
-3	34757	. Switch - Rangelite	1	
-4	34758	. Button - Rangelite	1	
-5	34753	. Contact - Ground	1	
-6	34761	. Clamp - Bulb	1	
-7	34751	. Contact	1	
	Attaching Part			
-8	121-2R4R	. Screw - Thread Forming, No. 2 x 1/4 pan hd	1	
	---***---			
-9	34953	. Lamp, 2 1/4v, 1/4amp (replaces p/n 25794)	1	
	34951	. Pad	1	
-10	34788	. Lens - Rangelite	1	
	Attaching Part			
-11	30540-7	. Washer - Spring, 0.250 x 0.375 x 0.007	1	
	---***---			
-12	34767	. Mirror - Rangelite	1	
	Attaching Part			
-13	32406	. Retainer - Mirror	2	
	---***---			
-14		. Mask (as selected for lens)	Ref.	
-15	30714P1	. Cap - Objective Lens	1	
	Attaching Part			
-16	121-2R2C	. Screw - Thread Forming, No. 2 x 1/8 pan hd	2	
	---***---			
-17	30713	. Lens Objective (replaces p/n 31249P1)	1	
-18	31119P2	. Spring - Objective Lens	1	
-19	34714	. Retainer - Rear Lens	1	
-20	34763	. Lens - Rear	1	
-21	30442-10	. Ring - Retaining	2	
-22	34765	. Window - Front	2	
-23	30442-11	. Ring - Retaining	1	
-24	34770	. Window - Rear	1	
-25	34744G1	. Housing Assembly	1	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

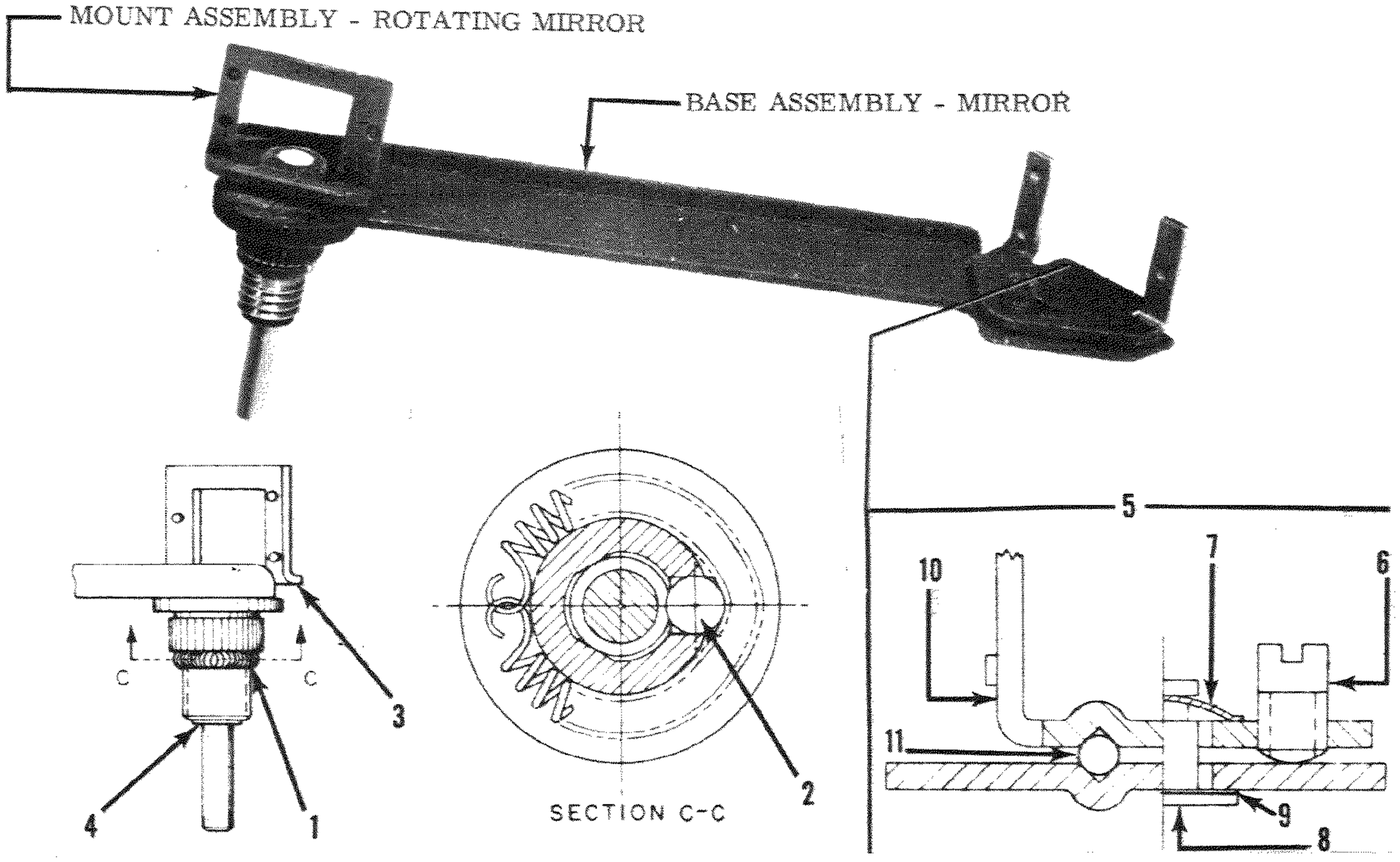


Figure 2B. BASE COMPLETE - MIRROR

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
2B-	34939G2	Base Complete - Mirror	Ref.	
-1	34936	. Spring - Shaft.	1	
-2	300-3	. Ball - Steel (0.0625 dia).	1	
-3	34938G1	. Mount Assembly - Rotating Mirror	1	
	Attaching Part			
-4	251-8L	. Ring - Retaining	1	
	---***---			
-5	34939G1	. Base Assembly - Mirror	1	
-6	34709	. . Screw - Machine (coincidence).	1	
-7	256-1L	. . Ring - Retaining	1	
-8	34708	. . Stud - Mirror Mount	1	
-9	30473-72	. . Washer - Flat, 0.250 x 0.128 x 0.005.	AR	
-10	34710P1	. . Mount - Transparent Mirror	1	
-11	300-3	. . Ball - Steel (0.0625 dia)	2	
		. . Base Subassembly	Ref.	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

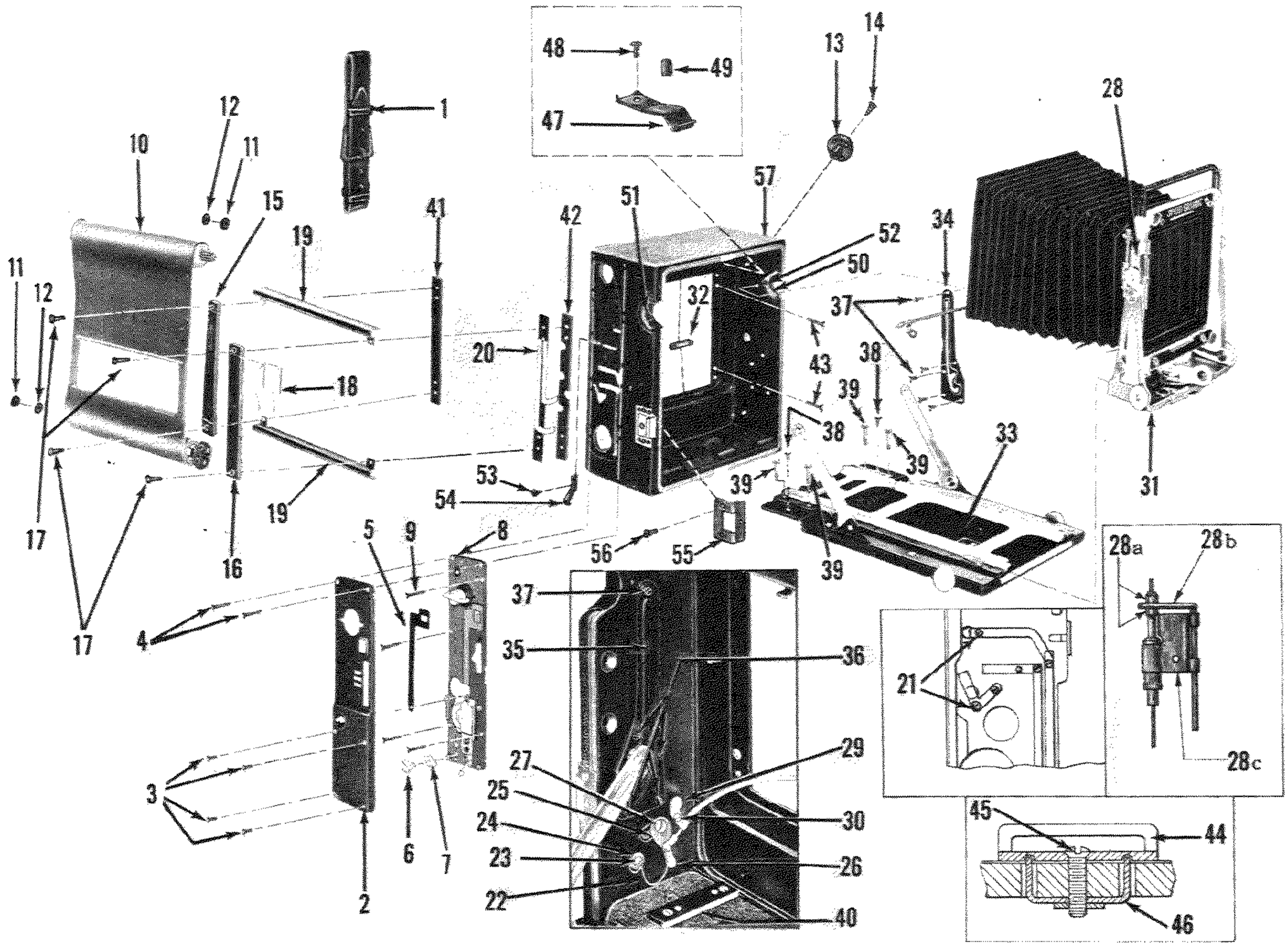


Figure 3. CAMERA BASIC

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
3-	34774G1	Camera Basic (Speed Graphic)	Ref.	
	34780G1	Camera Basic (Crown Graphic)	Ref.	
-1	33779G1	. Handle Assembly	1	
	33779P3	. . Loop	3	
-2	30351G1	. Cover Assembly - Shutter Plate (Speed Graphic) Figure 4	1	
	Attaching Parts			
-3	104B1-3Y	. Screw - Machine, No. 1-64 x 3/16 oval hd	4	
-4	152B1-8Y	. Screw - Wood, No. 1 x 1/2 oval hd	2	
	---***---			
-5	30346P2	. Slide - Dial (Speed Graphic)	1	
-6	30213P1	. Screw - Machine (retainer)	1	
-7	30212P1	. Retainer	1	
-8	30652G6	. Shutter Plate Complete (Speed Graphic) Figure 5	1	
	Attaching Part			
-9	150B1-8	. Screw - Wood, No. 1 x 1/2 round hd	4	
	---***---			
-10	30350G1	. Curtain & Rollers Complete (Speed Graphic)	1	
	30196G3	. . Roller Assembly - Gear	1	
	30211G1	. . Roller Assembly - Tension	1	
	30409G1	. . Curtain Assembly	1	
	31112	. . . Contact - Curtain	3	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

Figure and Index No.	Part Number	1 2 3 4 5	Nomenclature	Qty.	Code
3-11	30473-15	.	Washer - Flat, 0.281 x 0.147 x 0.0100 (Speed Graphic). . . .	AR	
-12	30473-24	.	Washer - Flat, 0.281 x 0.147 x 0.020 (Speed Graphic)	AR	
-13	30192P1	.	Bearing (0.359 in. lg.) Speed Graphic	AR	
	30192P2	.	Bearing (0.389 in. lg.) Speed Graphic	AR	
	Attaching Part				
-14	152B2R4E	.	Screw - Wood, No. 2 x 1/4 oval hd	6	
	---***---				
-15	30582P1	.	Block - Left (Speed Graphic).	1	
-16	30888P1	.	Block - Right (Speed Graphic)	1	
	Attaching Part				
-17	100B2-7K	.	Screw - Machine, No. 2-56 x 7/16 flat hd	4	
	---***---				
-18	30572	.	Contact (Speed Graphic)	2	
-19	30632P1	.	Guide - Curtain (Speed Graphic)	2	
-20	30893G1	.	Jumper Assembly (Speed Graphic)	1	
	Attaching Part				
-21	151-0-3L	.	Screw - Wood, No. 0 x 3/16 round hd.	2	
	---***---				
-22	31189	.	Spring - Cable Release (Speed Graphic)	1	
	Attaching Parts				
-23	151-1-3L	.	Screw - Wood, No. 1 x 3/16 round hd.	1	
-24	30473-25L	.	Washer - Flat, 0.281 x 0.094 x 0.012	1	
	---***---				
-25	31030G1	.	Lever Assembly - Cable Release.	1	
	Attaching Parts				
-26	151-2-3A	.	Screw - Wood, No. 2 x 3/16 round hd.	1	
-27	31226P2	.	Screw - Machine (special)	1	
	---***---				
-28	30798G1	.	Release Assembly - Cable	1	
-28a	30843P1	. .	Nut - Special (cable release)	2	
-28b	31097P1	. .	Rod - Manual Trip.	1	
-28c	31098P1	. .	Bracket - Manual Trip	1	
	Attaching Parts				
-29	151-2-3A	.	Screw - Wood, No. 2 x 3/16 round hd.	1	
-30	151-1-3A	.	Screw - Wood, No. 1 x 3/16 round hd.	1	
	---***---				
-31		.	Standard Complete - Front (Figure 6).	1	
	Attaching Part				
-32	32459	.	Clip - Bellows Retaining	2	
	---***---				
-33	30586G7	.	Bed Complete (Figure 7)	1	
	Attaching Parts				
-34	30718P1	.	Plate - Bed Brace, Left.	1	
-35	30718P2	.	Plate - Bed Brace, Right	1	
-36	150B2-3K	.	Screw - Wood, No. 2 x 3/16 flat hd	4	
-37	150B2-4K	.	Screw - Wood, No. 2 x 1/4 flat hd.	6	
-38	150B2-4K	.	Screw - Wood, No. 2 x 1/4 flat hd.	2	
-39	33926P2	.	Screw - Machine (special)	4	
-40	30488P1	.	Shim - Yoke Guide, Case (0.0040 in. thk.)	AR	
	30488P2	.	Shim - Yoke Guide, Case (0.0060 in. thk.)	AR	
	30488P3	.	Shim - Yoke Guide, Case (0.0160 in. thk.)	AR	
	---***---				
-41	30896P1	.	Spacer - Left Block (Speed Graphic).	1	
-42	30895P1	.	Strip - Mounting Insulation (Speed Graphic)	1	
	Attaching Part				
-43	112B2-2K	.	Screw - Machine, No. 2-56 x 1/8 truss hd (spacer & strip) .	4	
	---***---				
-44	30374P1	.	Bracket - Handle	2	
	Attaching Parts				
-45	104B6R8C	.	Screw - Machine, No. 6-32 x 1/2 oval hd	2	
-46	30375P1	.	Nut - Handle Bracket.	2	
	---***---				

Figure and Index No.	Part Number	1 2 3 4 5	Nomenclature	Qty.	Code
3-47	31729P2	.	Spring - Bed Catch	1	
	Attaching Part				
-48	112B3-3K	.	Screw - Machine, No. 3-48 x 3/16 truss hd.	1	
	---***---				
-49	31907	.	Button.	1	
-50	30647P1	.	Escutcheon - Left	1	
-51	31135P1	.	Escutcheon - Right	1	
	Attaching Part				
-52	30638-2K	.	Pin - Escutcheon	2	
	---***---				
-53	30303P1	.	Spring - Shift Slide (Speed Graphic)	1	
	Attaching Part				
-54	150B1-3	.	Screw - Wood, No. 1 x 3/16 flat hd.	1	
	---***---				
-55	30534P1	.	Plate - Release Slide.	1	
	Attaching Part				
-56	30749P1	.	Screw - Machine (special)	2	
	---***---				
	30940	.	Decalcomania.	1	
-57		.	Body Complete (Figure 8).	1	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

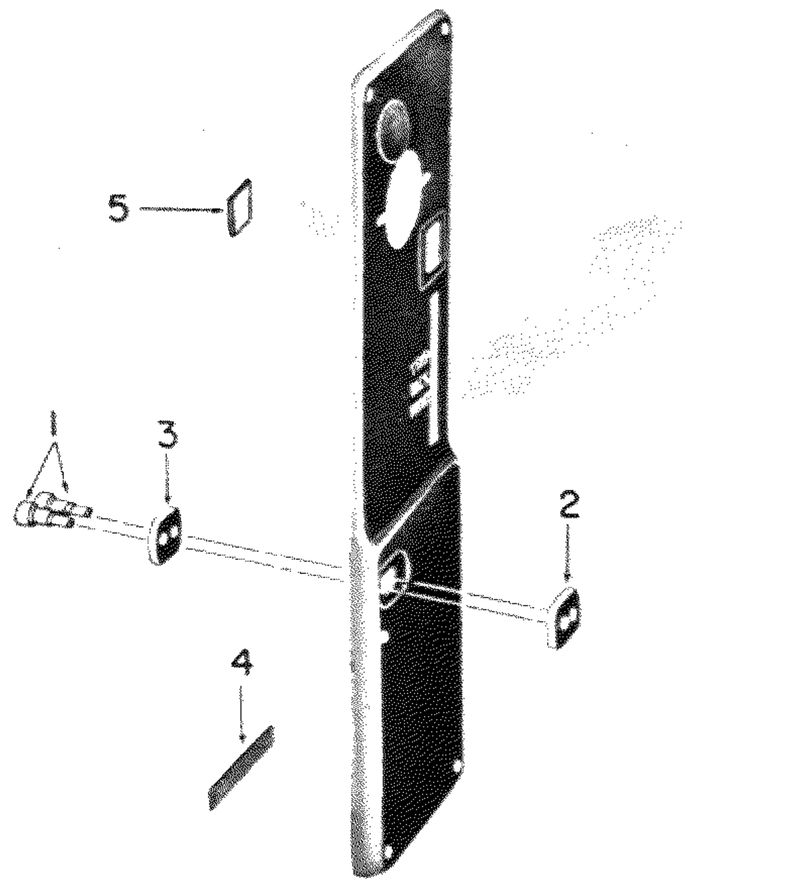


Figure 4. SHUTTER COVER PLATE

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
4-	30351G1	Cover Assembly - Shutter Plate	Ref.	
-1	30359P1	. Stud - Receptacle Contact.	2	
-2	30357	. Insulator - Receptacle	1	
-3	30358	. Washer - Receptacle.	1	
-4	30846	. Seal - Dust	1	
-5	30356	. Window - Shutter Plate	1	

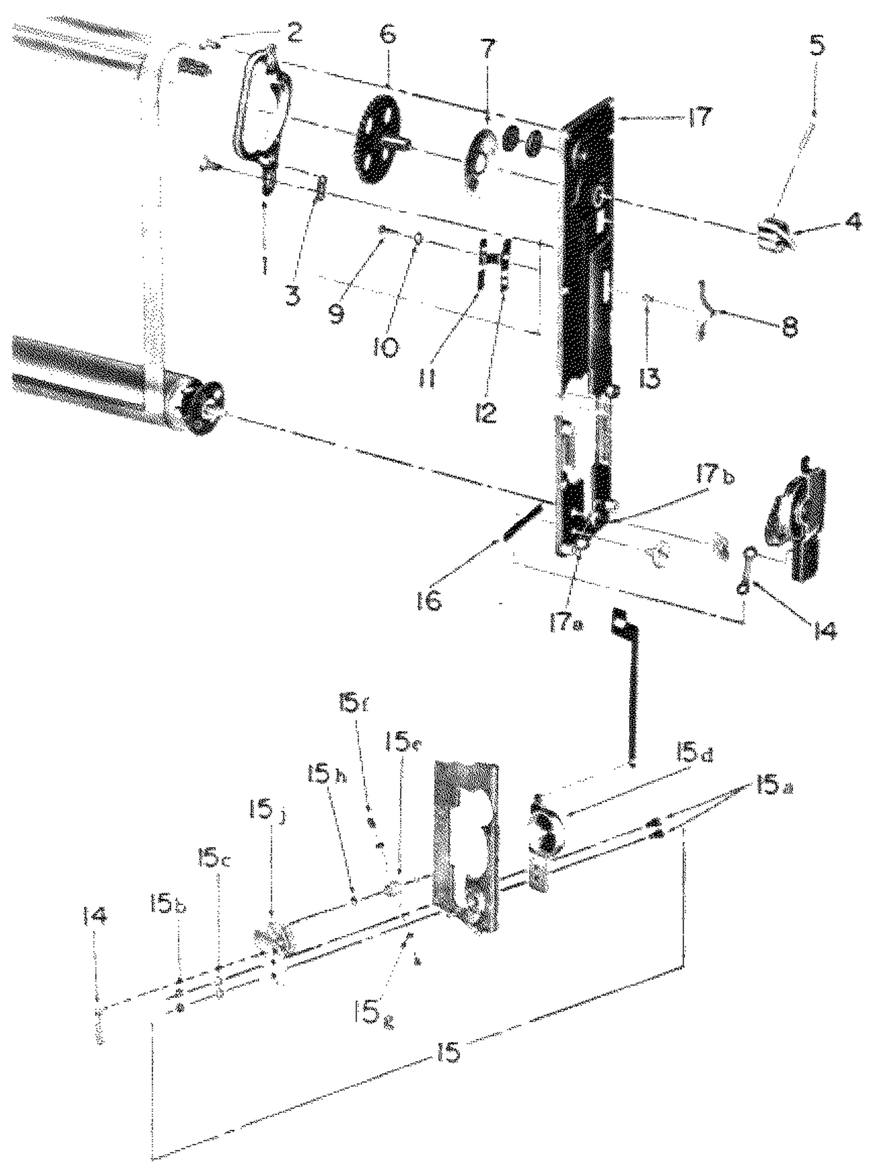


Figure 5. SHUTTER PLATE

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
5-	30652G6	Plate Assembly - Shutter Mechanism.	Ref.	
-1	30185G1	. Escapement Assembly.	1	
	Attaching Part			
-2	30187P1	. Screw - Escapement	2	
	---***---			
-3	30186	. Spring - Escapement.	1	
	30652G6N	. Winding Key and Master Gear Assembly.	1	
-4		. . Key Assembly - Winding.	NP	NHA
-5	30663-1	. . Pin - Taper, No. 5/0 x 0.0943 dia x 0.437 lg.	1	
-6		. . Gear Assembly - Master	NP	NHA
-7	30504P5	. Dial - Shutter.	1	
-8	30297P1	. Slide - Shift	1	
	Attaching Parts			
-9	102-2-5	. Screw - Machine, No. 2-56 x 5/16 round hd	1	
-10	221-2L	. Washer - Lock, 0.180 x 0.092 x 0.013	1	
	---***---			
-11	30303P2	. Spring - Shift Slide	1	
-12	30299P1	. Plate - Shift Slide.	1	
-13	30298P1	. Spacer - Shift Slide.	1	
-14	30340	. Spring - Governor.	1	
-15	30459G1	. Governor Complete.	1	
-15a	110B2-4	. . Screw - Machine, No. 2-56 x 1/4 binding hd	2	
-15b	200-2HL	. . Nut - Machine, No. 2 hex.	2	
-15c	221-2L	. . Washer - Lock, 0.180 x 0.092 x 0.013	2	
		. . Spacer - Governor.	NP	NHA
		. . Pin - Dial Slide.	NP	NHA
-15d	30682G1	. . Bracket Assembly - Top.	NP	NHA
-15e	30458G1	. . Pinion Assembly - Governor	1	
-15f	30454	. . Shoe - Governor	2	
-15g	33500-17	. . Washer - Flat, 0.125 x 0.063 x 0.032.	2	
-15h	30473-1	. . Washer - Flat, 0.156 x 0.067 x 0.005.	AR	
-15j		. . Bracket Assembly - Bottom	NP	NHA
-16	30301	. Strip - Light Seal	1	
-17	30348G2	. Plate Assembly	1	
-17a	30315G1	. . Lever Assembly	1	
-17b	30318	. . Stud - Retard Cam Lever	1	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGE FINDER
(1955 -)

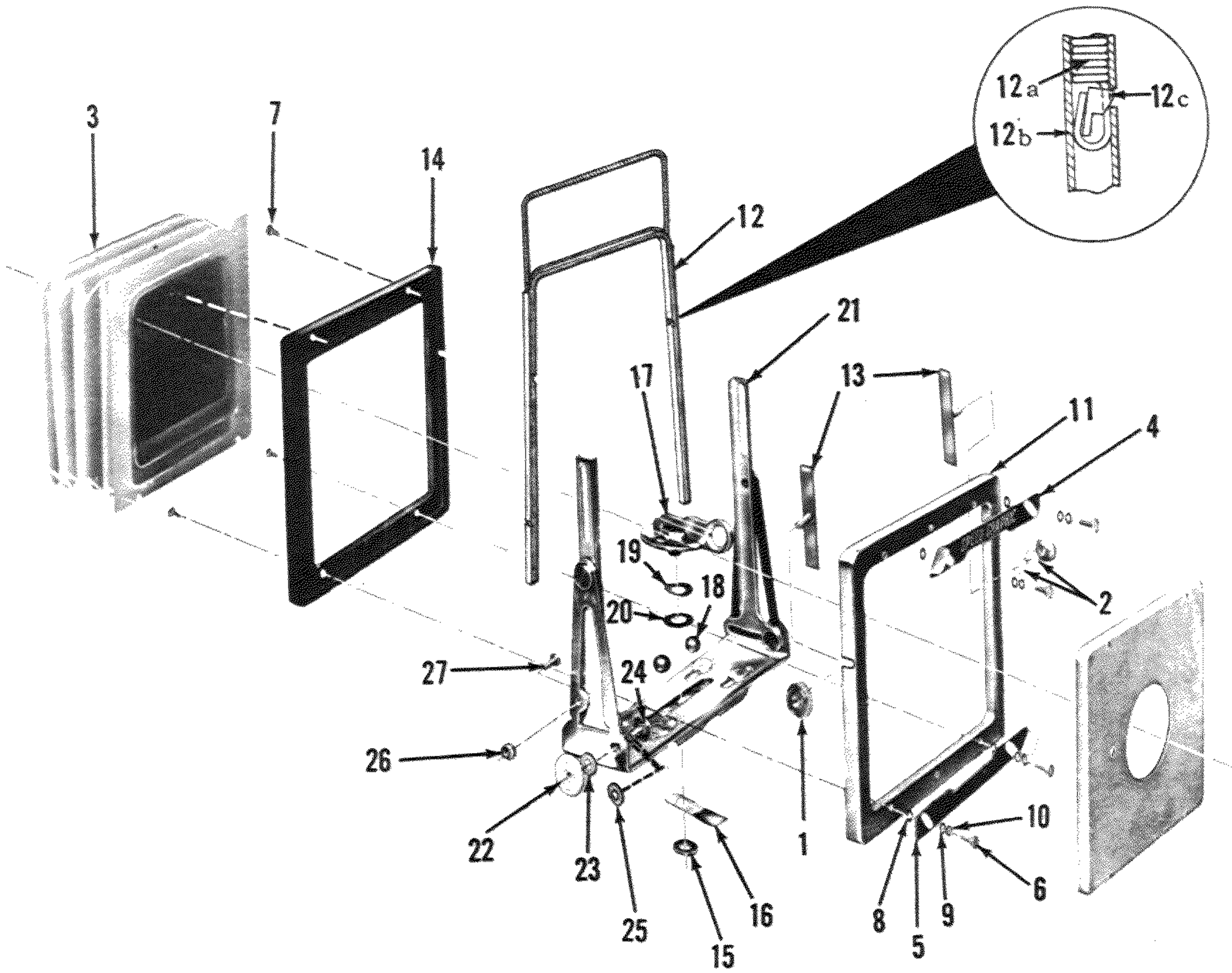


Figure 6. FRONT STANDARD

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
6-	34754G1	Standard Complete - Front (Speed Graphic).	Ref.	
	34754G2	Standard Complete - Front (Crown Graphic)	Ref.	
-1	30444P1	. Knob - Clamp.	2	
-2	30473-6	. Washer - Flat, 0.312 x 0.129 x 0.015	2	
-3	31061G3	. Bellows Assembly - Second	1	
	31183P1	. . Hanger - Cable Release	2	
	31148P1	. . Hanger - Cable Release	1	
	31149P1	. . Strip - Cable Release Hanger	3	
	34754G1T	. Front Standard Assembly (Speed Graphic)	1	
	34754G2T	. Front Standard Assembly (Crown Graphic)	1	
	34754G1N	. . Frame Assembly - Front Standard (Speed Graphic)	1	
	34754G2N	. . Frame Assembly - Front Standard (Crown Graphic)	1	
-4	30470P2	. . . Lock - Lensboard, Upper (Speed Graphic)	1	
	30470P4	. . . Lock - Lensboard, Upper (Crown Graphic).	1	
-5	30470P9	. . . Lock - Lensboard, Lower (Speed Graphic).	1	
	30470P3	. . . Lock - Lensboard, Lower (Crown Graphic)	1	
	Attaching Parts			
-6	30401P1	. . . Screw - Machine (slidelock).	4	
-7	30377P2	. . . Nut - Machine (slidelock)	4	
-8	30473-2	. . . Washer - Flat, 0.218 x 0.089 x 0.016.	4	
-9	30473-20	. . . Washer - Flat, 0.203 x 0.124 x 0.010.	4	
-10	30540-3	. . . Washer - Spring, 0.203 x 0.124 x 0.007	4	
	---***---			
-11	34620G4	. . . Frame Assembly - Outer Front	1	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

Figure and Index No.	Part Number	Nomenclature	Qty.	Code
6-12	34848G1	Finder Complete	1	
-12a	34785G1	. Finder Assembly	1	
-12b	34795P1	. Frame - Finder	1	
-12c	34787	. Stop - Finder	2	
-13	30425G5	Plate Assembly - Front Frame Clamp	2	
-14	30385P2	Frame - Inner Front	1	
	34754G1S	Standard Support Assembly - Complete	1	
-15	30553-1K	Nut - Machine (special)	1	
-16	30541P1	Spring - Locking	1	
-17	30537G1	Lever Assembly	1	
-18	300-10	Ball - Steel (0.250 dia) was p/n 30539P4	2	
-19	30540-1	Washer - Spring, 0.5312 x 0.265 x 0.007	1	
-20	30473-9G	Washer - Flat, 0.531 x 0.270 x 0.032	1	
-21	34621G2	Standard Assembly - Front (was p/n 34754G12)	1	
-22	30436P1	. Knob - Support Locking	2	
-23	30473-7	. Washer - Flat , 0.312 x 0.128 x 0.012	2	
-24	30543P1	. Screw - Machine (special)	2	
-25	30473-22	. Washer - Flat, 0.375 x 0.219 x 0.010	4	
-26	30440P1	. Nut - Front Standard Eccentric	2	
-27	30441P1	. Eccentric	2	
		. Standard Support Subassembly	Ref.	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGE FINDER
(1955 -)

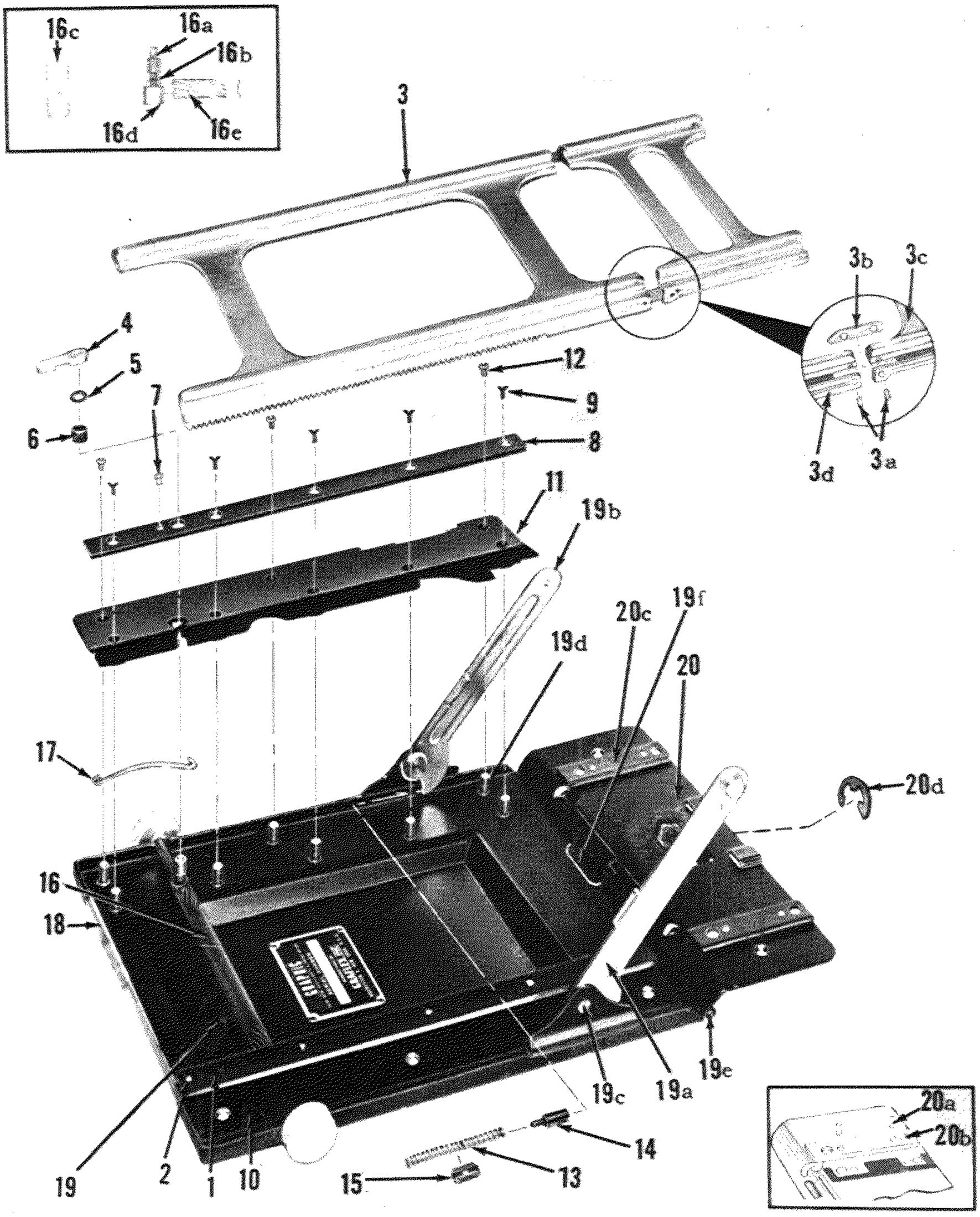


Figure 7. BED COMPLETE

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
7-	30586G7	Bed Complete	Ref.	
-1	30625P1	. Guide - Bed, Left	1	
	Attaching Part			
-2	31089P6	. Screw - Machine (special)	5	
	---***---			
-3	30596G1	. Yoke Assembly	1	
	30605	. . Pin - Front Standard Stop	1	
-3a	30603	. . Pin - Yoke Link	4	
-3b	30602	. . Link - Yoke	2	
-3c	30600P1	. . Yoke - Case Section	1	
-3d	30597P1	. . Yoke - Bed Section	1	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

Figure and Index No.	Part Number	1 2 3 4 5	Nomenclature	Qty.	Code
7-4	30629P1	.	Lever - Yoke Lock	1	
-5	30473-11A	.	Washer - Flat, 0.281 x 0.177 x 0.010	AR	
-6	30628	.	Sleeve - Yoke Lock	1	
-7	31246P2	.	Screw - Machine (lock stop)	1	
-8	30625P2	.	Guide - Bed, Right	1	
	Attaching Part				
-9	31089P6	.	Screw - Machine (special)	5	
	---***---				
-10	30617P2	.	Block - Bed, Left	1	
-11	30618P2	.	Block - Bed, Right	1	
	Attaching Part				
-12	31226P2	.	Screw - Machine (special)	6	
	---***---				
-13	30616	.	Spring - Bed Brace	2	
-14	31766P1	.	Plunger - Bed Brace	2	
	Attaching Part				
-15	31271	.	Clip - Spring Retaining	2	
	---***---				
-16	30586G2M	.	Shaft Assembly - Pinion (same as p/n 30586G7M)	1	
-16a	170D3-3A	. .	Screw - Set, No. 3-48 x 3/16 flat point	1	
-16b	30630	. .	Pad - Yoke Lock	2	
-16c	30612P1	. .	Knob - Focusing	2	
-16d	30607P1	. .	Post - Yoke Lock	1	
-16e	30606P1	. .	Pinion - Focusing	1	
-17	30610	.	Spring - Focusing Pinion	2	
-18	31730P2	.	Escutcheon - Bed	1	
-19	34615G8	.	Bed Assembly - Second	1	
-19a	30421G1	. .	Brace Assembly - Left	1	
-19b	30421G2	. .	Brace Assembly - Right	1	
	Attaching Part				
-19c	30623P1	. .	Rivet - Brace Assembly	2	
	---***---				
	32671P1	. .	Covering	1	
-19d	30915P1	. .	Bushing - Guide & Block	16	
-19e	30172-25	. .	Pin - Straight (hinge)	1	
-19f	34797	. .	Spring - Bed Kickout	1	
		. .	Hinge (refer to 30586G7R for replacement)	Ref.	
		. .	Bed	Ref.	
-20	30586G7R	.	Hinge Assembly	1	
-20a	30685-2	. .	Pin - Dowel	4	
-20b	30590P1	. .	Guide - Case, Left	1	
-20c	30590P2	. .	Guide - Case, Right	1	
-20d	30241-21	. .	Ring - Retaining	1	
		. .	Socket - Tripod	NP	NHA
		. .	Hinge - Bed	NP	NHA

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGEFINDER
(1955 -)

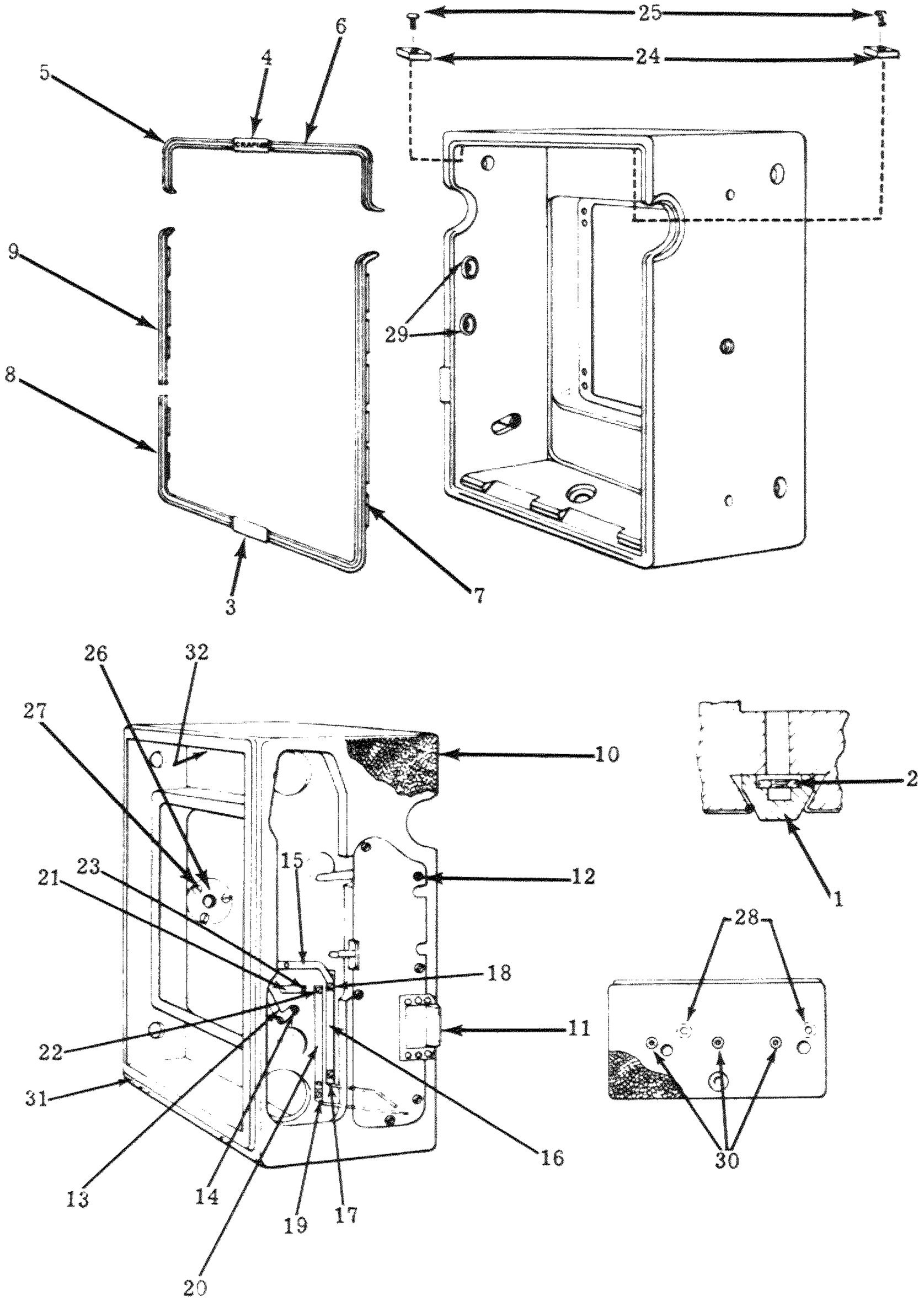


Figure 8. BODY COMPLETE

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
8-	34775G1	Body Complete (Speed Graphic)	Ref.	
	34775G2	Body Complete (Crown Graphic)	Ref.	
-1	30747P1	. Foot (Speed Graphic)	2	
	30899P1	. Foot (Crown Graphic)	2	
	Attaching Part			
-2	200-3SA	. Nut - Machine, No. 3 square	4	
	---***---			
-3	30640P1	. Plate - Molding, Lower	1	
-4	30640P2	. Plate - Molding, Upper	1	
-5	30645P6	. Molding - Upper Right	1	
-6	30645P5	. Molding - Upper Left	1	
-7	30641P1	. Molding - Lower Left	1	
-8	30642P1	. Molding - Lower Right	1	
-9	30643P1	. Molding - Center Right	1	
-10	32668P1	. Covering (Speed Graphic)	1	
	30559P75	. Covering (Crown Graphic)	AR	
-11	30525G1	. Plate Assembly - Body Release (Speed Graphic)	1	
	30874G1	. Plate Assembly - Body Release (Crown Graphic)	1	
	Attaching Part			
-12	150B1-6	. Screw - Wood, No. 1 x 3/8 flat hd	6	
	---***---			
-13	30822	. Contact - Receptacle (Speed Graphic)	1	
	Attaching Part			
-14	151B0-2	. Screw - Wood, No. 0 x 1/8 round hd	1	
	---***---			
-15	30304	. Jumper (Speed Graphic)	1	
-16	30561	. Jumper - Switch (Speed Graphic)	1	
-17	31269	. Contact - Short (Speed Graphic)	1	
	Attaching Part			
-18	151B0-2	. Screw - Wood, No. 0 x 1/8 round hd	2	
	---***---			
-19	31268	. Contact - Long (Speed Graphic)	1	
-20	30561	. Jumper - Switch (Speed Graphic)	1	
-21	30491P1	. Jumper - Receptacle	1	
	Attaching Parts			
-22	151B0-2	. Screw - Wood, No. 0 x 1/8 round hd	2	
-23	30638-6	. Pin - Escutcheon, No. 20 x 1/8 in. lg.	1	
	---***---			
-24	34929	. Stop - Bed	2	
	Attaching Part			
-25	150B2-5K	. Screw - Wood, No. 2 x 5/16 flat hd	2	
	---***---			
-26	30372P2	. Socket - Slide	1	
	Attaching Part			
-27	150B2-4	. Screw - Wood, No. 2 x 1/4 flat hd	3	
	---***---			
-28	34742	. Insert - R. F. Housing	2	
-29	31186	. Insert - Encircling Bracket	2	
-30	31905P1	. Insert - Latch	3	
-31	30673P1	. Insert - Bottom (Speed Graphic)	1	
-32	30673P4	. Insert - Top (Speed Graphic)	1	

PACEMAKER GRAPHIC "45"
SPEED & CROWN
WITH GRAPHIC RANGE FINDER
(1955 -)

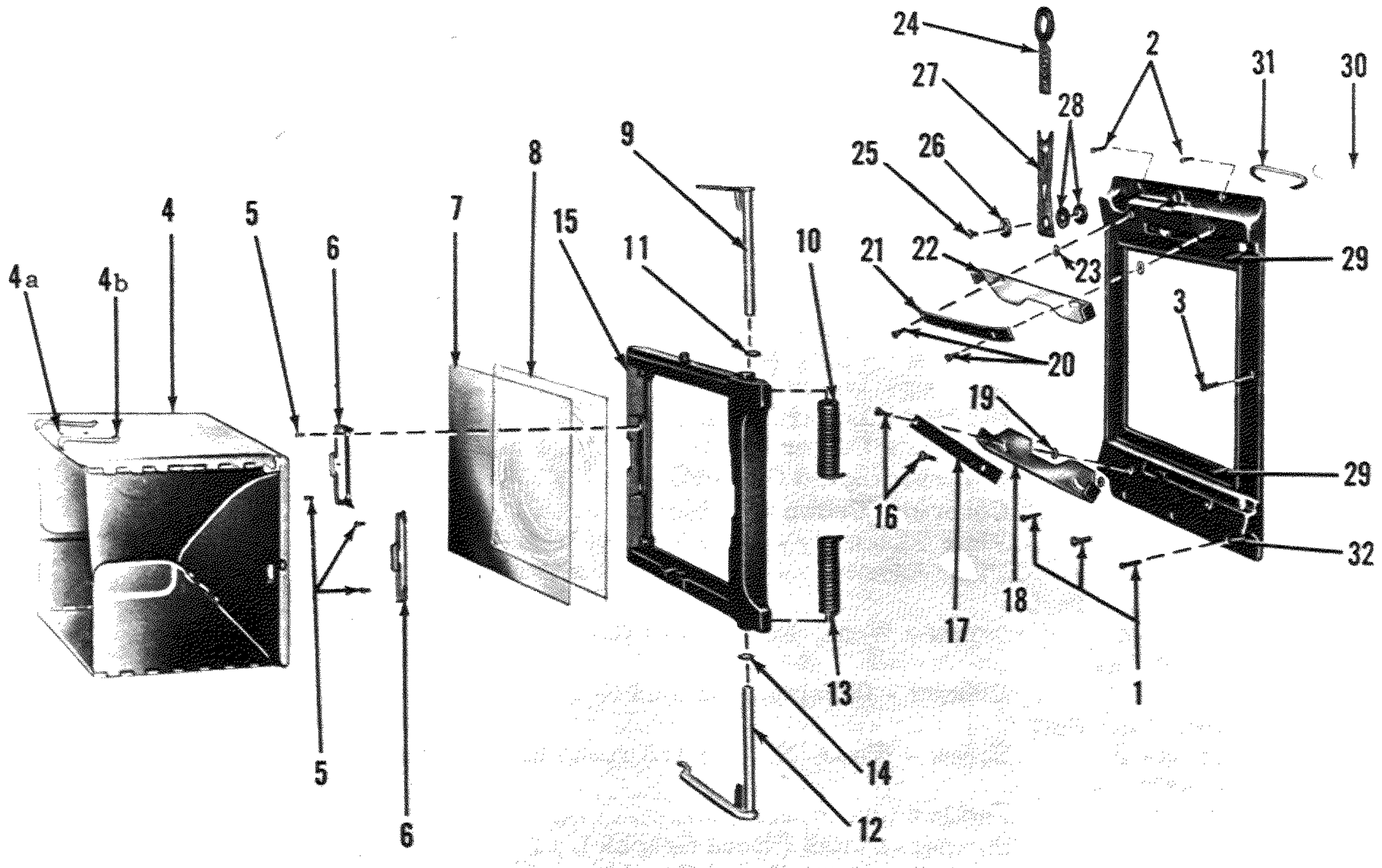


Figure 9. GRAFLOK BACK COMPLETE

Figure and Index No.	Part Number	1 2 3 4 5 Nomenclature	Qty.	Code
9-	34796G1	Back Complete - Graflok (including screws for mounting) Speed Graphic	Ref.	
	34796G2	Back Complete - Graflok (including screws for mounting) Crown Graphic	Ref.	
-1	30921-7W	. Screw - Self Threading, No. 2 x 1/2 pan hd (Speed Graphic).	3	
	30921-6W	. Screw - Self Threading, No. 2 x 3/8 pan hd (Crown Graphic)	3	
-2	30921-6W	. Screw - Self Threading, No. 2 x 3/8 pan hd.	2	
-3	150B1-6K	. Screw - Wood, No. 1 x 3/8 flat hd	1	
-4	30159G3	. Hood Assembly , Cat. No. 9147	1	
-4a	30363-1	. . Rivet - Clip	2	
-4b	31988P1	. . Clip - Dark Slide.	1	
	31715G4	. Frame Complete - Focusing, Cat. No. 9281	1	
-5	100-2-3W	. . Screw - Machine, No. 2-56 x 3/16 flat hd	4	
-6	30371P1	. . Retainer - Hood	2	
-7	30414P1	. . Screen - Ground Glass Focusing	1	
-8	31935P1	. . Screen - Ektalite.	1	
	33837G4	. . Frame Assembly - Focusing.		
-9	31717G6	. . . Arm Assembly - Upper.	1	
-10	31916P1	. . . Spring - Upper	1	
-11	30473-53K	. . . Washer - Flat, 0.312 x 0.219 x 0.0100	1	
-12	31717G5	. . . Arm Assembly - Lower	1	
-13	31916P2	. . . Spring - Lower	1	
-14	30473-53K	. . . Washer - Flat, 0.312 x 0.219 x 0.0100	1	